

Resume of
WILLIAM W. WOESSNER

Current as of June 2009

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EDUCATION

- 1978 Ph.D. in Geology (Hydrogeology), minor in Civil and
 Environmental Engineering, University of Wisconsin,
 Madison
 1974 M.S. in Water Resources Management, University of Wisconsin,
 Madison
 1973 M.S. in Geology, University of Florida, Gainesville
 1971 B.A. Major in Geology, College of Wooster, Ohio

Short Courses

- 1997 Completed: Groundwater Model Calibration and Uncertainty Analysis
 Using Nonlinear Regression and Associated Methods, USGS
 Training Center, Denver, CO.
 1985 Completed: Modeling Pollutant Movement in Groundwater
 University of Wisconsin, Madison
 1984 Completed: Applied Modeling of Ground Water Flow and Pollution
 Holcomb Research Institute, Butler University

APPOINTMENTS and AWARDS

- 2007-present Chair, Department of Geosciences, The University of Montana
 2007 John Hem Excellence in Science and Engineering Award, Association of Ground Water Scientists
 and Engineers Membership Division, National Ground Water Association
 2004-2006 National Research Council Committee on River Science at the U.S.G.S., Water Science Board
 National Academe of Sciences
 2003-2008 Fulbright Senior Specialists Roster. Approved by J. William Fulbright Foreign
 Scholarship Board (FSB), the Bureau of Education and Cultural Affairs of the Department of
 State (ECA), and the Council for International Exchange of Scholars (CIES) to be considered
 for grants offered by overseas programs requiring expertise in my area of specialty.
 2003-2007 Acting Director of The University of Montana Center for Riverine Science and Stream Re-
 naturalization
 2003-2008 Editorial Board, Italian Journal of Engineering Geology and Environment: Geologic risks,
 Site investigation, Slope stability, Groundwater research, Water resources management,

- Economic Geology, Applied geophysics, Land use management, Rock and soil characterization
- 2005 California Bay-Delta Authority Water-Management Science Board
- 2005 Birdsall-Dreiss Distinguished Lecturer 2005, Geological Society of America, Hydrogeology Section (61lectures)
- 2004 Regents' Professor, The University of Montana
- 2001-04 Board of Directors, Association of Ground Water Scientists and Engineers, National Ground Water Association (two terms)
- 1989-90 National Research Council Committee on Ground Water Recharge in Surface-Mined Areas.
- 1996-98 Associate Editor, *Ground Water*
- 1983-85 Governor's Groundwater Advisory Council, State of Montana
- 1979-81 National Research Council Committee on Groundwater Resources in Relation to Coal Mining, Parent Committee. Chairman, Subcommittee on Western Coal Development, Editorial Subcommittee member.

PROFESSIONAL REGISTRATION

- 1985 to Present: American Institute of Hydrology
PROFESSIONAL HYDROGEOLOGIST, Certificate No. 528

PROFESSIONAL EXPERIENCE

Teaching and Research

9/81 to Present, Position: Regents' Professor (7/04) and Chair(8/07) (Professor 9/89-6/04; Associate Professor, 9/81 to 8/89), Department of Geosciences, University of Montana, Missoula, 59812. Responsibilities include teaching and research in basic and applied hydrogeology. Teaching includes courses in Hydrogeology, Advanced Hydrogeology, Groundwater Modeling, Environmental Geology, SW-GW Interactions and Hydrogeology Field Camp. Groundwater research concentrates on quantifying flow systems in intermountain valleys, resource analysis, ground water - surface water interactions, characterization of hazardous wastes and contaminant transport including virus transport, and the use of groundwater flow models to evaluate conceptual models and make predictions.

7/92 to 12/95, Position: Short Course Instructor. Organizations sponsoring courses included Geological Society of America, National Ground Water Association, Environmental Education Enterprises, and Southwest Florida Water Management District. Co-instructor with Professor Mary Anderson, University of Wisconsin-Madison, of a one to three day short course on applying numerical groundwater flow models to field scale problems.

9/89 to 6/90, Position: Visiting Scholar, Centre for Groundwater Research, University of Waterloo, Ontario. Sabbatical year. Guest lecturer at center seminars and in courses on contaminant transport, ground water resource analysis and field methods. Participated in a joint research project examining ground water movement in low permeable clays.

10/78 to 9/81, Position: Assistant Research Professor and Research Coordinator-WRC Las Vegas, Water Resources Center, Desert Research Institute, Las Vegas, Nevada 89109. Research responsibilities included the initiation of applied and basic research in arid land hydrology. Specific projects included work in the areas of well field design, aquifer analyses, flash flood quantity and quality relationships, reservoir stage/groundwater interactions, geothermal production/groundwater contamination evaluations, hydrologic and salt balances of arid systems, and cause and effect relationships of a rising water table in an urban area. Research Coordinator responsibilities included the scheduling of technical staff, facilitating principal investigators work and providing liaison with the University of Nevada - Las Vegas campus (12/80-8/81).

3/75 to 9/78, Position: Hydrogeologist/Principal Investigator, Northern Cheyenne Research Project, Box 388, Lame Deer, Montana 59043. Principal Investigator: EPA Grant #R80356601/02/03 "Potential Impacts to Groundwater and Surface Water Quality and Quantity from Proposed Energy Development on the Northern Cheyenne Reservation, Montana." Responsibilities included the direction of hydrologic research related to a three year EPA grant including the design and implementation of surface water and ground water resource monitoring programs and prediction of potential impacts to the water resources from coal strip mining. Duties also included coordinating the work of a secretary- bookkeeper; and M.S. level Hydrologist; two M.S. level Geologists; an Assistant Geologist, Hydrologist and Hydrogeologist; and managing a three year budget of \$638,000.

1/77 to 6/77, Position: Off-campus faculty member. Rocky Mountain College, Billings, Montana, and the Northern Cheyenne Follow Through Program, Lame Deer, Montana. Responsibilities included the development of a curriculum for a four credit Physical Geology course and teaching the course in Lame Deer, Montana.

Technical Review and Assistance

1988 -1991, Bureau of Solid and Hazardous Waste, Montana Department of Health and Environmental Sciences, Technical reviewer of ground water work by state, EPA and PRP contractors at the following CERCLA Sites: Milltown Reservoir, Anaconda Smelter, Rocker, Butte Mine Flooding.

1981- present, Missoula City County Health Department, Advising on issues related to ground water contamination, Sole Source Aquifer, well head protection and ground water systems.

1992-1998, Natural Resource Damage Assessment, State of Montana vs. ARCO.

1981- to present. Consulting on Hydrology and Hydrogeology, private, state and federal

Selected Research

Water Development and Management: 1975-1978 Evaluation of groundwater-surface water resources on the Northern Cheyenne Reservation as part of large EPA project. 1977 Evaluation of water withdrawal from the Wheatland, Wyoming basin for power plant development. 1978-1981 Evaluation of water supply potential from an alluvial aquifer for a large power plant in southern Nevada, Nevada Power Company. 1979 Evaluation of the development of an artificial shallow aquifer in Las Vegas. 1988 Evaluation of the surface water and groundwater resources for the City and County of Missoula, Montana, because of concern over increased

pumping and water level decline. 1981-present As the supervisor of Master of Science work the evaluation of surface and groundwater resources of the Helena Basin, Dillon Basin, Sullivan Flats Basin, Missoula Basin, Bitterroot Basin, Sheridan Basin and Arlee Basin, all of which are between 30 and 100 square miles in area. Groundwater modeling using MODFLOW was conducted for each study. 1992-1997 Technical reviewer for EIS's being developed by for large scale gold mines in Nevada. Review includes all phases of basin scale hydrogeology and finite element modeling. 1992-1998 Consultant for the State of Montana Natural Resource Damage Assessment that involves quantifying groundwater resources in three mining impacted basins. Work for Montana Water Center and Mountain Water Company, Missoula, MT regarding water quality impacts to a sole source alluvial aquifer.

Surface Water- Groundwater Interaction: 1975-1978 Groundwater-surface water interactions on the Northern Cheyenne Reservation as part of large EPA water resources investigation. 1980 Intermittent flow evens and salinity loading relationships in the lower Colorado Basin. 1981 Erosion and salinity problems in arid regions, 1983 SW-GW relationships in Lake Mead, NV. Salinity balance for the Lower Virgin River Basin, NV-AZ. 1984 Mine tailings GW and SW impacts. 1987 Urban runoff injection to groundwater, Missoula. 1989 Recharge-discharge relationships in Jocko Valley Aquifer. 1990, National Academy of Science Committee on Ground water recharge in surface mined areas. 2002 Hydrogeology of the floodplain of the Middle Fork of the Flathead River as part of a 3 year NSF Biocomplexity research effort (Stanford), 2002 Surface-groundwater exchange and temperature modification NASA Umatilla Tribes, Umatilla River (O'Daniel). 2004-2005 Microbial Observatory- river-floodplain exchange, NSF. 2004-2005 River recharge and water sources to wells in the Missoula Aquifer, Montana, Montana Water Center and Mountain Water Company. 2006 Member of the Science Advisory Panel convened to comment on the development of the Michigan Water Assessment Tool, a mechanism to assess how groundwater pumping would impact stream flows and fisheries-for the Groundwater Conservation Advisory Council, State of Michigan. Starting in 2006 initiated a modeling project with MTDEQ/EPA to forecast the groundwater level impacts resulting from the pre-removal drawdowns and dam removal actions at the 30 ft high Milltown Dam/Reservoir, Western Montana.

Groundwater Modeling: 1979 Water balance modeling of potential impacts to water resources of the Northern Cheyenne Indian Reservation. 1981- present groundwater flow and solute transport modeling. MODFLOW modeling of water resources of Helena, Missoula, Dillon, Sullivan Flats and Arlee Basins via MS student research. 1992- *Applied Groundwater Modeling* book with Mary Anderson. Groundwater Modeling short course instructor for National Water Well Association 1993-1994, the US Army Corps of Engineers (1993), SW Florida Water Management District (1994) Geological Society of America (1995). 1993-94 reviewer of large numerical models produced to predict dewatering and recovery at Gold Quarry Mine and the Lone Tree Mine in Nevada for EISs. 1994 review of groundwater model for the Kansas City Plant, Alternative Concentration Limit Demonstration, Oak Ridge National Lab. 1994-95 reviewer of a groundwater model for the planned expansion of the Lone Star Aggregate Mine NE extension in Columbia County Oregon. 1998, Independent expert review of two models of the Prescott, AZ, area for the Director of the Arizona Department of Water Resources, 1998, Independent expert review of a vadose zone and groundwater model for the near Moab, Utah, Nuclear Regulatory Agency. 1999 review of flow and solute transport model of dissolved phase transport of solvents in a basin groundwater system for private industry. 1990-current numerous publications on calibrating and appropriately applying groundwater models. 2005 to present Independent review of finite element modeling of a fractured sandstone aquifer impacted with TCE. 2006 modeling of water table changes related to the removal of the 30ft high Milltown Dam in Western Montana.

PROFESSIONAL PUBLICATIONS

69. Magruder, I., W.W. Woessner, and S.N. Running. In press. Ecohydrologic-process modeling of mountain-block ground water recharge. *Ground Water*.
68. Poole, G. C., S.J. O'Daniel, K.L. Jones, W. W. Woessner, E.S. Bernhardt, A. M. Helton, J.A. Stanford, B.R. Boer, and T. J. Beechie. In press. Hydrologic spiraling: the role of multiple interactive flow paths in stream ecosystems. *River Research and Applications*.
67. Arrigoni, A. S., G. C. Poole, L. A. K. Mertes, S. J. O'Daniel, W. W. Woessner and S. A. Thomas, 2008. Buffered, lagged, or cooled? Disentangling hyporheic influences on temperature cycles in stream channels. *WRR* 44, Wo9418, doi: 10.1029/2007WR006480,2008, 1-13.
66. Jones, K.L., G.C. Poole, W.W. Woessner, M.V. Vitale, B.R. Boer, S.J. O'Daniel, S.A. Thomas, B.A. Geffen. 2008. Geomorphology, hydrology, and aquatic vegetation drive seasonal hyporheic flow patterns across a gravel-dominated floodplain. *Hydrological Processes*. 22:2105-2115.
65. Woessner, W. W., 2007. Building a compact, low-cost, and portable peristaltic sampling pump. *Ground Water*, 45:6, p795-797.
64. Woessner, W. W., 2007. Influence of pumping on surface water features in basin headwaters. Proceedings of the American Bar Association-Environmental, Energy and Resources Section. 25th Annual Water Law Conference, Coronado, CA, February 22-23.
63. Committee on River Science at the U.S. Geological Survey 2007. River Science at the U. S. Geological Survey. Water Science and Technology Board, Division on Earth and Life Studies, national Research Council of the National Academies. The National Academies Press, Washington, D. C., ISBN 978-0-309-10357-2: 193p.
62. Woessner, W. W., 2007, Applied Flow and Solute Transport Modeling in Aquifers: Fundamental Principles and Analytical and Numerical Methods- Taylor & Francis Group , CRC Press 667 p. ISBN 0-8493-3574-4 Vedat Batu author. Book Review for *Vadose Zone Journal*..
61. Godfrey, E., W. W. Woessner and M. J. Benotti, 2007. Pharmaceuticals in on-site effluent and groundwater, western Montana. *Ground Water*. *Ground Water*, 45 (3), p. 263-271.
60. Tallman, A. A. and W. W. Woessner. 2006. Adaptive management of water resources. Proceedings 2006 AWAR Summer Specialty Conference, Missoula, MT. 7 p.
59. Dahm, C.N., H. M. Valett, C.V. Baxter and W. W. Woessner. 2006. Hyporheic Zones. Chapter 6. in *Methods in Stream Ecology*, Ed. F.R. Haur and G. A Lamberti, AP Elsevier, Amsterdam. p. 119-142.

58. Johnson, Adam N., Brian R. Boer, William W. Woessner, Jack A. Stanford, Geoffrey C. Poole, Steven A. Thomas, and Scott 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.
57. Godfrey, Emily and William W. Woessner. 2004. Screening level study of pharmaceuticals in septic tank effluent and a wastewater treatment plant waste stream. *Proceedings of the 4th International Conference on Pharmaceuticals and Endocrine Disrupting Chemicals in Water*, held October 13-15, 2004, in Minneapolis, Minnesota (copyright 2004 by the National Ground Water Association, ISBN 1-56034-114-9): 296-308.
56. Poole G.C., Stanford JA, Running SW, Frissell CA, Woessner WW, Ellis BK. 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.
55. Reeves, D.M. and W.W. Woessner. 2004. Hydrologic controls on the survival of Water Howellia (*Howellia aquatilis*) and implications of land management, *Journal of Hydrology*, 287 (1-4): 1-18
54. Loustaunau, P. K., W. W. Woessner and J. A. Kuhn, 2003. MTBE Fate near a Ground Water-Stream Interface. *Proceedings 2003 Petroleum Hydrocarbons and Organic Chemicals in Ground Water*, 20th Annual Conference, National Ground Water Association., Costa Mesa, CA. August 19-22, p. 229-240.
53. Baxter, C., Hauer, F. R. and Woessner, W. W., 2003. Measuring groundwater-stream exchange: New techniques for installing min-piezometers and estimating hydraulic conductivity. *Transactions of the American Fisheries Society*, 132: 493-502.
52. Moore, J.N., and Woessner, W.W., 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.
51. Woessner, W. W. and Anderson, M. P., 2002. The Hydro-Maloprop and the ground water table. *Groundwater* Vol. 40, no 5, p 465.
50. Woessner, W. W., Ball, P. N., DeBorde, D. C and Troy, T. L., 2001. Viral transport in a sand and gravel aquifer under field pumping conditions. *Ground Water* 39 (6), p. 886-894.
49. Moore, J.N. and Woessner, W. W., 2000. Solute and solid phase relationships in the surface hyporheic zone of a metal contaminated stream, Silver Bow Creek, MT. *Proceedings of the Ground-Water/Surface Water Interactions Workshop*. USEPA/542/R-00/007, p. 151-155.
48. Woessner, W. W., 2000, Stream and fluvial plain ground-water interactions: re-scaling hydrogeologic thought. *Ground Water*, 38 (3), p. 423-429.
47. Gammons, C.H., Woessner, W. W. and Griffin, J.H., 2000. Examination of impacts to the surface-water and groundwater systems of the upper Clark Fork River from 100 years of mining and smelting. *in* Roberts, S., and

Winston, D. Eds., Geologic field trips, western Montana and adjacent areas: Rocky Mountain Section of the Geological Society of America, University of Montana , p. 65-84.

46. Anderson, M.P. and Woessner, W. W., 2000, Applied Groundwater Modeling-Simulation of Flow and Advective transport. Chinese Translation. Harcourt Asia Pte Ltd.

45. Woessner, W. W., 1999, Conceptualization and complexities of modelling groundwater-stream interaction at the near-channel scale. Proceedings of ModelCARE'99. ETH, Zurich, Switzerland, Vol II, 781-786.

44. DeBorde, D.C., Woessner, W. W., Kiley, Q. T., and Ball, P., 1999, Rapid transport of viruses in a floodplain aquifer. *Water Research*, 33(10): 2229-2238..

43. Huggenberger, P., E. Hoehn, R. Beschta, and W. Woessner. 1998. Abiotic aspects of channels and floodplains in riparian ecology. *Freshwater Biology* 40: 407-425.

42. Woessner, W. W. and Anderson, M. P., 1998, Advantages and disadvantages of teaching MODFLOW using pre- and post- processors. Ed. E. Poeter, C. Zheng and M. Hill. Proceedings of MODFLOW'98 International Conference, Colorado School of Mines, Golden, CO., Vol. 1, p.473-480.

41. Woessner, W. W., 1998, Changing views of stream-ground-water interaction. Proceedings of American Institute of Hydrology/International Association of Hydrologists XXVIII Congress: Gambling with Groundwater, Physical, Chemical and Biological Aspects of Aquifer-Stream Relationships., Sept. 1998, Las Vegas, NV, American Institute of Hydrology, St. Paul, MN, p.1-6.

40. DeBorde D.C., Woessner, W.W., Lauerma, B. and Ball, P., 1998, Virus occurrence and transport in a school septic systems and unconfined aquifer. *Ground Water*. 36 (5), p. 825-834.

39. DeBorde, D.C., Woessner, W. W., Lauerma, B., and Ball, P., 1998, Coliphage prevalence in high school septic effluent and associated groundwater. *Water Research* 32(12), p. 3781-3785.

38. Woessner, W.W., Troy, T., Ball, P. and DeBorde, D.C., 1998, Virus transport in the capture zone of a well penetrating a high hydraulic conductivity aquifer containing a preferential flow zone: Challenges to Natural Disinfection, Proceedings of Source Water Protection International 98, Dallas Texas, April 28-30, National Water Research Institute, p. 167-174.

37. Woessner, W.W. and DeBorde, D.C., 1998, Virus transport in the floodplain groundwater of a headwater stream, western Montana, USA, *Headwaters: Water Resources and Soil Conservation* (ed. M.J. Haigh, J. Krecek, G.S. Rajwar and M.P.Kilmartin, IAHC, A. A. Balkema, Rotterdam, p. 197-207.

36. Woessner, W.W. and Anderson, M. P, 1996, Good model-bad model, understanding the flow modeling process. Ed. J. Richey and J. Rumbaugh III, ASTM D-18 Soil and Rock, D18.21 Ground Water and Vadose Zone Investigations, Phil., PA, p. 14-23.

35. Anderson, M.P. and W.W. Woessner, 1994, Applied Groundwater Modeling: Simulation of Flow and Advective Transport, Japanese Translation, Kyoritsy Shuppan Co., Ltd., 246 p.
34. Billings, J.G. and W.W. Woessner, 1993, The use of natural gradient tracer test data to refine the three-dimensional hydraulic conductivity distribution of a heterogeneous unconfined aquifer. Proceedings of the 1993 Ground Water Modeling Conference, International Ground Water Modeling Center and Colorado School of Mines, Denver, CO., June 9-12, 1993, p. 1-50 - 1-60.
33. Anderson, M.P. and Woessner, W.W., 1992, The role of the postaudit in model validation. Advances in Water Resources-Special Issue on Model Validation, Vol. 15, p. 167-173.
32. Woessner, W.W. and C. Brick, 1992, The role of groundwater in sustaining shoreline spawning kokanee salmon, Flathead Lake, Montana. In the Proceedings for 1st International Conference on Ground Water Ecology, AWWRA, Tampa, FL, April 26-29, 1992, p. 257-266.
31. Woessner, W.W., V.H. Remenda, R. Ingelton and V. Kuhnel, 1992, Design and installation of small diameter piezometers to characterize flow and transport in Lake Agassiz, Clay. In the Proceedings for 1992 North Dakota Water Quality Symposium, Bismarck, Feb., p. 292-301
30. V.H. Remenda, D.L. Rudolph, J.A. Cherry, V. Kuhnel and W. Woessner, 1992, Major and minor ions in Lake Agassiz clay near Manvel N.D.: Implications for water quality and soil salinity. In the Proceedings for 1992 North Dakota Water Quality Symposium, Bismarck, Feb., p. 302-310
29. Anderson, M.P. and W.W. Woessner, 1992, Applied Groundwater Modeling: Simulation of flow and advective transport. Academic Press, 372 pp.
28. Woessner, W.W. and Anderson, M.P., 1992, Selecting calibration values and formulating calibration targets for ground-water flow simulations. In the Proceedings for Solving Ground Water Problems with Models, Association of Ground Water Scientists and Engineers, Dallas Texas, February 11-13, 1992.
27. Stephenson, D. A., B. L. Cutright and W. W. Woessner, 1991, Hydrogeology: It is. GSA Today, Vol. 1, No. 5, p. 93-99.
26. Stephenson, D. A., B. L. Cutright and W. W. Woessner, 1991, Hydrogeology: It is. reprinted from GSA Today, Vol. 1, No. 5, p. 93-99. in Minnesota Ground Water Association Newsletter, October, Vo. 10, No. 3, p. 4-5.
25. Woessner, W.W. and Anderson, M.P., 1990, Setting calibration targets and assessing model calibration - room for improvement: an example from North America. in Calibration and Reliability in Groundwater Modelling, ModelCARE 90, The Netherlands, ed. Kovar, International Association of Hydrological Sciences Publication No. 195, Wallingford, Oxfordshire, UK, p. 279-288.
24. Anderson, M.P. and W.W. Woessner, 1990, Comment on Editorial: Who are these Manuals for? The model documentation needs for practitioners, F.D. Arnold, Ground Water.

23. Committee on Ground Water Recharge in Surface-Mined Areas, 1990, Surface Coal Mining Effects on Ground Water Recharge, (W.W. Woessner Committee Member), National Academy Press, Washington, D. C., 159 pp.
22. Woessner, W.W. and D.F. Potts, editors, 1989, Proceedings of the symposium on headwaters hydrology. American Water Resources Association, Bethesda, Maryland, 708 pp.
21. Woessner, W.W., Lazuk, R. and Payne, S., 1989, Characterization of aquifer heterogeneities using EM and surface electrical resistivity surveys at Lubrecht experimental forest, western Montana. Proceedings of the National Outdoor Action Conference on Aquifer Restoration, Ground Water Monitoring and Geophysical Methods. AGWSE-NWWA, p. 951-963.
20. Thompson, W.R., Makepeace, S. and Woessner, W.W., 1989, Recharge/discharge relationships in a coarse-grained alluvial aquifer. Proceedings of the Symposium on Headwaters Hydrology, Woessner and Potts, ed., AWRA, p. 695-703.
19. Woessner, W.W., 1988, Drill through casing driver method for construction of monitoring wells in coarse, unconsolidated sediments. Ground Water Monitoring Review, Winter 1988, p. 69-72.
18. VerHey, M.E. and Woessner, W.W., 1988, Documentation of the degree of waste treatment provided by septic system, vadose zone and aquifer in intermontane soils underlain by sand and gravel. Proceedings of Am Soc of Ag Eng, December 14-15, 1987, Chicago.
17. Woessner, W.W. and VerHey, M.E., 1988, Water quality management options for a coarse alluvial western mountain valley aquifer impacted by septic system wastes. Proceedings of Am Soc of Ag Eng, December 14-15, 1987, Chicago.
16. Woessner, W.W., 1987, Using the drill through casing hammer method for monitoring well construction and water quality characterization in a metal contaminated gravel, cobble and boulder aquifer. First National Outdoor Action Conference on Aquifer Restoration, Ground Water Monitoring and Geophysical Methods. NWWA, pp. 373-397.
15. Woessner, W.W. and Wogsland, K.L., 1987, Effects of urban storm water injection by Class V wells on a potable ground water system, Proceedings of the International Symposium on Class V Injection Well Technology. September 22-24, Washington D.C. Underground Injection Practices Council, Inc. Research Foundation, Oklahoma City, Ok, p. 137-159.
14. Woessner, W.W. and Shapley, M.D., 1985, Interaction of antimony mine tailing ponds and ground water. Montana Water Research Center, Bozeman, Montana, Rpt. No. 145, 81 p.
13. Shapley, M.D. and Woessner, W.W., 1985, Transport of antimony processing wastes in the Prospect Creek drainage. Montana Academy of Science, Clark Fork Symposium.

12. Woessner, W.W. and Sullivan, K.E., 1984, Results of seepage meter and mini-piezometer study, Lake Mead, Nevada. *Groundwater*, Vol. 22, No. 5, pp. 561-568.
11. Woessner, W.W. and Shapley, M., 1984, The effects of U.S. Antimony's disposal ponds on an alluvial aquifer and Prospect Creek, western Montana. Montana Water Resources Research Center, Bozeman, Montana, Report No. 145, 81 p.
10. Woessner, W.W., Mifflin, M.D., French, R.H., Elzeftawy, A. and Zimmerman, D.E., 1984, Salinity balance of the Lower Virgin River basin, Nevada and Arizona; Salinity in Water Courses and Reservoirs. R. French Ed., Ann Arbor Science Publishers, Inc., pp. 145-157.
9. Woessner, W.W. and Sullivan, K.E., 1983, Use of seepage meters and mini piezometers for identification of reservoir-groundwater interactions in Lake Mead, Nevada: Water Resources Center, Desert Research Institute, Pub. No. 410 82, 12 p.
8. Committee on Groundwater Resources in Relation to Coal Mining, 1981, Coal mining and groundwater resources in the United States: National Resource Council, National Academy Press, Washington, D.C., 197 p. William W. Woessner, member of Parent Committee; Chairman, Western Subcommittee; member of Editorial Committee.
7. French, R.H. and Woessner, W.W., 1981, Erosion and salinity problems in arid regions: Symposium on the Aquatic Resources Management of the Colorado River Ecosystem, Las Vegas, NV, Utah Water Res. Laboratory.
6. French, R.H. and Woessner, W.W., 1981, Erosion and salinity problems in arid regions: ASCE Water Forum 81, San Francisco, CA, pp. 1319-1326.
5. Woessner, W.W., Osborne, T.J., Heffern, E.L., Andrews, C., Whiteman, J., Spotted Elk W., and Morales-Brink, D., 1981, Hydrologic impacts from potential coal strip mining Northern Cheyenne Reservation: U.S. EPA-600-7-81-004a, NTIS PB811550i61, 303 p.
4. Woessner, W.W., 1980, Qualitative assessment of the economic impacts of a rising water table, Las Vegas, Nevada: Water Resources Center, Desert Research Institute, No. 41068, 24 p.
3. Woessner, W.W., 1980, Intermittent flow events - salinity loading relationships in the lower Colorado Basin, Southern Nevada: Hydrology and Water Resources in Arizona and the Southwest, Arizona Section AWRA, Tucson, Arizona, Vol. 10, pp. 109-119.
2. Woessner, W.W., 1980, Reconnaissance evaluation of water quality - salinity relationships of intermittent flow events in a desert environment, Las Vegas, Nevada, Water Resources Center, Desert Research Institute, Publication 44021, 16 p.
1. Woessner, W.W., Andrews, C.B., Osborne, T.J., 1979, The impacts of coal strip mining on the hydrogeologic system of the Northern Great Plains: Case study of potential impacts on the Northern Cheyenne Reservation: In

W. Back and D.A. Stephenson, The George Burke Maxey Volume of Hydrology, J. Hydrology, Vol. 43, pp. 445-467.

PAPERS PRESENTED AT MEETINGS OF SCHOLARLY SOCIETIES AND UNIVERSITIES

217. D. G. Abbey, S. C. James, P. J. Martin, B. Zhang, W. W. Woessner, R. G. Andrachek, C. Gabriel and B.W. Arnold, 2009. Optimization and Uncertainty Analysis for a Complex and Highly Parameterized Groundwater System. PEST Conference. Virginia. Nov. Accepted
216. Woessner, W. W., 2008. Mitigating a +100 million dollar impact to a groundwater supply using uncertain model results: approach and decisions. MODFLOW and More 2008. International ground Water Modeling Center, Colorado School of Mines, April.
215. Berthelote, A., W. Woessner, 2008. The influence of multiple conceptual models on well replacement strategies required to mitigate dam removal activities. MODFLOW and More 2008. International ground Water Modeling Center, Colorado School of Mines, April.
214. Gannon, J., P. Ramsey, K. Feris, J. Moore, W. Woessner and M. Rilling 2008. Riparian ecosystem consequences-a microbial perspective: or prediction and quantifying natural resource damage in chronically stressed ecosystems. NIEHS International Symposium on Mine Tailings. June 4-6 University of Arizona.
213. Woessner, W. W., 2008 (**INVITED**) Isn't the calibration of an interpretive groundwater model the testing of multiple conceptual models? NGWA 2008 Summit. Session, March 30-April 3. Memphis, TN.
212. Woessner, W. W., 2008 (**INVITED**). Snow on the mountains, green grass and Indianapolis: a model of a colleague. NGWA 2008 Summit. Session In Memory of Thomas Prickett, March 30-April 3. Memphis, TN.
211. Berthelote, A., W. W. Woessner. 2008. The influence of multiple conceptual models on well replacement strategies required to mitigate dam removal activities. NGWA 2008 Summit, March 30-April 3. Memphis, TN.
210. Swierc, J. and W. W. Woessner. 2008. Preliminary Hydrogeologic assessment of storm water infiltration through Class V injection wells in a coarse grained vadose zone, Missoula valley, Montana. NGWA 2008 Summit. March 30-April 3. Memphis, TN.
209. Swierc, J. E. and W. W. Woessner. 2007. Assessment of geologic controls to infiltration through a coarse grained vadose zone, Missoula valley, Montana. Annual Meeting GSA. Nov. Denver, CO.
208. Engstrom, D., W. W. Woessner and J. E. Gannon. 2007. Preferential flow-paths developed in hyporheic open-framework gravels of braided river sediments. Annual Meeting GSA. Nov. Denver, CO.

207. Engstrom, D., W. W. Woessner and J. E. Gannon. 2007. The role of open-framework gravels in creation of preferential flow in hyporheic braided river sediments. Annual Meeting GSA. Nov. Denver, CO.
206. Storb, Meryl, Antony Berthelote, Anthony Farinacci, and William Woessner 2007. Surface Water Groundwater Exchange in a Leveed Section of the Clark Fork River Floodplain above Milltown Dam, Western Montana. Fifth Annual River Center Meeting: "Ecology - when it comes to river restoration design, so what?" September 20 and 21, The University of Montana.
205. Engstrom, Dale, William W. Woessner, and James E. Gannon 2007. The Role of Open-Framework Gravels in the Creation of Preferential Flow Paths in Hyporheic Braided River Sediments. Fifth Annual River Center Meeting: "Ecology - when it comes to river restoration design, so what?" September 20 and 21, The University of Montana.
204. Berthelote, Antony, Anthony Farinacci, Meryl Storb, and William Woessner 2007. Impacts of Pre-Dam Removal Reservoir Drawdowns on Linked Aquifer Water Levels, Milltown, Western Montana. 2007. Fifth Annual River Center Meeting: "Ecology - when it comes to river restoration design, so what?" September 20 and 21, The University of Montana, Missoula, MT.
203. Poole, G. C., S. J. O'Daniel, K. L. Jones, E. S. Bernhardt, A. M. Helton, W. W. Woessner and B.R. Boer, 2007. Hydrologic spirals: a conceptual model for the hydrologic template of alluvial stream and river ecosystems. North American Benthological Society. 55 th Annual Meeting. Spring.
202. Woessner, W. W., 2007. "The discovery continues"... do mid-sized university geoscience departments need to evolve? NSF Workshop Connecting Geoscience Departments to the Future of Science: New Structures for Research and Curriculum. Carlton College April 25-April 27 2007.
201. Woessner, W. W., 2006 (**INVITED**). Assessing multiple scale groundwater-surface water exchange in coarse-grained fluvial stream systems. Geological Society of America National Meeting, Philadelphia, Technical Program, October 22, p. 121.
200. Farinacci, A., A. Beothote, W. W. Woessner, and J. Harvala, 2006. Monitoring the impact to ground water from drawdown of the Milltown Reservoir during the initial stage of dam removal, western Montana. 4th Annual Conference "Assessing Stream Restoration Success: Developing Sustainable Ecological and Physical Systems. Center for Riverine Science and Stream Re-naturalization, Missoula, MT. Sept. 28 and 29.
199. Woessner, W. W., 2006. (**INVITED**). The Ground Water Model. Managing Clark Fork River Basin Ground Water. Clark Fork Technical Advisory Committee and the Center for Riverine Science and Stream Re-naturalization, University of Montana, September 27.
198. Woessner, W. W., 2006 (**INVITED**). Groundwater and groundwater issues in the Missoula valley. Park Water Company Engineering Conference, Missoula, MT. June 22.
197. Woessner, W. W., 2006 (**INVITED**) The science and technology: Restoration opportunities and obligations, the Montana university system. Governor's Restoration Conference, Billings, MT., June 8-9.

196. Woessner, W. W., 2006 **(INVITED)** Is there value in independent model oversight, or how can you become a better modeler without modeling? Modflow and More 2006: Managing ground water Systems. International ground Water Modeling Center, Colorado School of Mines, May 21-24.
195. Woessner, W. W., 2006 **(INVITED)**. Groundwater and groundwater issues in the Missoula valley. Senior Forum, Missoula, MT. May 10.
194. Sutherland, M. K., W. W. Woessner, J. Kuhn and P. Skibicki, 2006. Assessing traditional well log techniques in determining the hydrologic controls on a MTBE contaminated aquifer, western MT. 2006 Ground Water Summit, NGWA, San Antonio, TX, April23-26.
193. Engstrom, D., W. W. Woessner and J. E. Gannon, 2006. Hydrologic investigation of preferential flow paths, Nyack floodplain, Montana. 2006 Ground Water Summit, NGWA, San Antonio, TX, April23-26.
192. Woessner, W. W., 2006. **(INVITED)** Water water everywhere: will there be a drop to drink? 2006 University of Montana Alumni Lecture Series. Sun to Seeds, Our World Around Us, March.
191. Woessner, W. W., 2006. **(KEYNOTE)** Occurrence and persistence of sewage-source pharmaceuticals in shallow groundwater. British Columbia Ground water Association Annual Meeting, Langley City, B. C. March.
190. Woessner, W. W., 2006. **(INVITED)** Surface water leakage as a primary source of water to production wells: geochemical and physical approaches. British Columbia Ground water Association Annual Meeting, Langley City, B. C. March.
- 128-189. Geological Society of America Birdsall Dreiss Distinguished Lecturer Spring, Summer and Fall 2005 **(INVITED)** 61 lectures at 49 Colleges, Universities and Groundwater Organizations. Lecture Titles:
- Examining the Exchange of Groundwater With Stream/Floodplain Systems: Physical, Thermal, Geochemical Approaches with ties to Stream Renaturalization.*
- Occurrence, Transport and Fate of Viruses and Pharmaceuticals in Groundwater Impacted by Septic System Effluent: The Hydrogeologist and Human Health.*
127. Boer, B. R., Woessner, W. W., Poole, G. C., O'Daniel, S. J. 2005. A heat budget for a shallow channel/floodplain aquifer: influence of riparian zone land use on river temperature, Northeastern Oregon. National Meeting Geological Society of America. Salt Lake City, UT. October, Program Vol. 37, No 7, p. 27.
126. O'Daniel, S. J., G. C. Poole, L.A.K Mertes, and W. W. Woessner, 2005. Stream temperature controls related to shallow groundwater exchange,. American Fisheries Society Meeting, Anchorage, AK. 9/05
125. O'Daniel, S. J., G. C. Poole, L.A.K Mertes, and W. W. Woessner, 2005. A data rich approach to water quality management, National States Geographic Information Council, Rochester, NY. 9/05
124. Woessner, W. W., 2005. **(INVITED)** Convocation Address- The University, Its Faculty and Being a Student. 2005-2006 August 27, 2005. The University of Montana New Student Convocation. University Theater.

123. Jones, K. L. , M. V Vitale, S. J. O'Daniel, G. C. Poole, L.A.K. Mertes, W. W. Woessner, 2005. Hyporheic Hydrology of the Umatilla River: Interactions among Physical and Biological Drivers, Eos Trans. AGU,86(18), Jt. Assem. Suppl., Abstract H41A-02, B33E-17.May
122. O'Daniel, S. J., G. C. Poole, L.A.K Mertes, and W. W.Woessner, 2005. Inferring floodplain subsurface flowpaths using remote sensing vegetation indices, Eos Trans. AGU,86(18), Jt. Assem. Suppl., Abstract H41A-02
USDA/NASA meeting, New Orleans, LA., 5/05
121. O'Daniel, S. J., G. C. Poole, L.A.K. Mertes, and W. W. Woessner, 2005. Remote sensing inputs to drive a data rich water quality decision support system, International Association of Landscape Ecology, Syracuse, NY, March
120. O'Daniel, S. J., G. C. Poole, L.A.K. Mertes, and W. W.Woessner, 2005. Creating and validating metadata in a data rich computing environment, Earth Science Information Partnership Meeting, Washington DC, January
119. O'Daniel, S. J., G. C. Poole, L.A.K. Mertes, and W. W. Woessner, 2004. An information rich approach to water quality management, Oregon Watershed Enhancement Board (OWEB) Biannual Meeting, Ashland,OR. November
118. O'Daniel, S. J., G. C. Poole, L.A.K Mertes, and W. W.Woessner, 2004. A multisensor approach to water quality management, Geoscience and Remote Sensing Symposium, 2004. IGARSS '04. Proceedings. Institute of Electrical and Electronic Engineers (IEEE), September
117. A. Arrigoni, G.C. Poole, S. J. O'Daniel S.A. Thomas, W.W.Woessner, L.A.K. Mertes and B.R. Boer. 2003. The Effect of Geomorphic Complexity on Water Temperature in a Pacific Northwest Alluvial River, Presented at the Fall 2003 American Geophysical Meeting December.
116. Geffen, B.A., G. C. Poole¹, M.V. Vitale, B.R. Boer, S.A. Thomas¹, W.W. Woessner, and S. O'Daniel, 2004. Seasonal variation in water sources within the hyporheic and perirheic zones of an alluvial floodplain, Presented at the NABS Annual meeting, Vancouver, British Columbia, June.
115. Vitale, M.V., G.C. Poole¹, B.A. Geffen¹, B.R. Boer, S.A. Thomas, W.W. Woessner, and S. O'Daniel, 2004. Spatiotemporal variation in channel-aquifer hydrologic connectivity within the hyporheic zone of an alluvial river. Presented at the NABS Annual meeting, Vancouver, British Columbia, June.
114. Arrigoni, A.S., G.C. Poole, L.A.K. Mertes, W.W. Woessner, S. O'Daniel, S.A. Thomas, and B.R. Boer. 2004. The effect of geomorphic complexity on water temperature in a Pacific Northwest alluvial river. Presented at the NABS Annual meeting, Vancouver, British Columbia, June.

113. O'Daniel, S. J., G. C. Poole, L.A.K Mertes, and W. W. Woessner, 2004. Data Rich Decision Support Environment for Water Quality, Pacific Northwest Chapter of the Society of Wetland Scientists National Meeting, July 11-15.
112. O'Daniel, S. J., G. C. Poole, L. A. K. Mertes, W. W. Woessner, 2004. DRDiSE Project / CTUIR, Capstone Engineering conference, Northern Arizona State University, Flagstaff, April; Northwest Power Planning and Conservation Council, Portland, OR. 2/5/04; Umatilla Watershed Technical Committee, Pendleton, OR. 2/24/04; BPA/CBFWA - Collaborative Systemwide Monitoring & Evaluation Committee, Portland, OR. 2/23/04; Idaho Department of Environmental Non-point Source Workshop, Boise, ID., 1/04; Umatilla Watershed Technical Committee, Pendleton, OR. 12/21/03
111. Godfrey, Emily and William W. Woessner. 2004. Screening level study of pharmaceuticals in septic tank effluent and a wastewater treatment plant waste stream. Proceedings of the 4th International Conference on Pharmaceuticals and Endocrine Disrupting Chemicals in Water, held October 13-15, 2004, in Minneapolis, Minnesota
110. Diehl, Cain, Brian Boer, William W. Woessner, Jack Stanford, and Mac Hendrix, 2004. Characterizing groundwater flow patterns and water exchange in a highly conductive floodplain, Middle Fork of the Flathead River, MT. Proceedings of Assessing Rivers Impacted by Dams and Dam Removal, Center for Riverine Science and Stream Re-naturalization, Sept. 23 and 24, Missoula, MT.
109. Pete, Shandin, William W. Woessner, and Seth Makepeace, 2004. Defining pre re-naturalized surface water/groundwater exchange in the channel and floodplain of the Jocko River, Flathead Indian Reservation, Montana. Proceedings of Assessing Rivers Impacted by Dams and Dam Removal, Center for Riverine Science and Stream Re-naturalization, Sept. 23 and 24, Missoula, MT.
108. Boer, Brian, William W. Woessner, Matt Vitale, Emily Godfrey, Scott O'Daniel, Geoffery, Poole, Alicia Arrigoni and Leal Mertes, 2004. Constraining streambed and aquifer hydrologic and thermal properties by 2D modeling surface water-ground water heat exchange in the Umatilla River, Oregon. Proceedings of Assessing Rivers Impacted by Dams and Dam Removal, Center for Riverine Science and Stream Re-naturalization, Sept. 23 and 24, Missoula, MT.
107. Fiaschetti, Aaron, Seth Makepeace and William W. Woessner, 2004. Assessment of Pre Re-naturalized Ground Water Exchange in Two Stream Channels and Riparian Zones, Jocko Valley, Western Montana. Proceedings of Assessing Rivers Impacted by Dams and Dam Removal, Center for Riverine Science and Stream Re-naturalization, Sept. 23 and 24, Missoula, MT.
106. Gannon, J. E., W.W. Woessner, J.A. Stanford, and W.E. Holben, 2004. The Nyak microbial observatory. NSF Microbial Observatory National Meeting, Big Sky Montana.
105. Cook, R., A. Tallman and W. Woessner, 2004. Preliminary Results for Defining River Recharge and the Fate of Arsenic in the Shallow Groundwater System Adjacent to a Losing River, Western Montana.

Proceedings of Assessing Rivers Impacted by Dams and Dam Removal, Center for Riverine Science and Stream Re-naturalization, Sept. 23 and 24, Missoula, MT.

104. Tallman, Amelia, Robyn Cook and William W. Woessner. 2004. Preliminary Results of a Capture Zone Study on Bank-side Production Wells and Their Interaction with a Perched River in an Alluvial Aquifer, Western Montana. Proceedings of Assessing Rivers Impacted by Dams and Dam Removal, Center for Riverine Science and Stream Re-naturalization, Sept. 23 and 24, Missoula, MT.

103. Woessner, W. W., 2004. Controls on the transport of pathogens in groundwater systems. Workshop on Geology and Human Health. NSF NAGT May, Chico Hot Springs, Montana.

102. Woessner, W. W., 2004. Conditions, Plans and Issues: Milltown Dam. Missoula Mining Club, February.

101. Boer, B. R., W. W. Woessner, S. A. Thomas, S. O'Daniel, G. Poole, A. Arrigoni and L. Mertes, 2003. Preliminary analyses of surface water-groundwater flux and heat exchange in a northeast Oregon stream and floodplain. GSA National Meeting. Proceeding Abstracts Vol. 35 (6), Denver.

100. Brick, C. and W. W. Woessner, 2003. Groundwater modeling at Milltown Reservoir to predict the impacts of dam removal. Assessing and Re-naturalizing Streams Impacted by Mining, Center for Riverine Science and Stream Renaturalization Annual Meeting, Missoula, MT, September and MT AWRA meeting, Butte, MT, October

99. Boer, B. R., W. W. Woessner, S. A. Thomas, S. O'Daniel, G. Poole, A. Arrigoni and L. Mertes, 2003. Preliminary analysis of natural thermal pulses in a floodplain aquifer: Interpreting aquifer properties along the Umatilla River, Oregon. MT AWRA, October, Butte, MT

98. Boer, B. R., W. W. Woessner, S. A. Thomas, S. O'Daniel, G. Poole, A. Arrigoni and L. Mertes, 2003, Preliminary assessment of the role of groundwater as a control on stream temperature in a northeastern Oregon stream. Assessing and Re-naturalizing Streams Impacted by Mining, Center for Riverine Science and Stream Renaturalization Annual Meeting, Missoula, MT, September.

97. Diehl, C., B. Boer, J. Stanford, W. Woessner and M. Hendrix, 2003, Preliminary results of investigating and characterizing groundwater flow patterns in a highly conductive floodplain, Middle Fork of the Flathead River, MT. Assessing and Re-naturalizing Streams Impacted by Mining, Center for Riverine Science and Stream Renaturalization Annual Meeting, Missoula, MT, September.

96. Woessner, W. W., 2003, **(INVITED)**, Judging Amy's Model: Assessing Flow Model Credibility. MODFLOW2003 and More, International Groundwater Modeling Institute, Colorado School of Mines, Sept. 2003.

95. Woessner, W. W., 2003. **(INVITED)** Role of data in modeling. Science for Judges Workshop. Dividing the Waters: A dialog for judges, masters and referees. Snowbird, Utah, April 28, 29.

94. Cosens, B. and Woessner W. W., 2003. . **(INVITED)** Negotiation of the Montana-National Park Service compact. Science for Judges Workshop. Dividing the Waters: A dialog for judges, masters and referees. Snowbird, Utah, April 28, 29.
93. Leake, S. A. and Woessner, W. W., 2003. . **(INVITED)** MODFLOW data structure, surface water/ground water modeling. Science for Judges Workshop. Dividing the Waters: A dialog for judges, masters and referees. Snowbird, Utah, April 28, 29.
92. Poole, G. C., O'Daniel, S., Woessner, W. W., Mertes, L., Thomas, S. A. , Arrigoni, A. and Qin, X. 2003, Hyporheic flow response to historical changes in channel morphology and flow regulation. Association of Limnologists' and Oceanographers, Salt Lake City, February.
91. Woessner, W. W., 2002. **(KEYNOTE)** Exchange of Ground Water and Stream Systems: Conceptualization and Implications for Renaturalization. National Ground Water Association, Association of Ground Water Scientists and Engineers, National Meeting, Las Vegas, NV, December
90. Loustaunau, P. K., Woessner W. W. and Kuhn, J., 2002, MTBE-behavior at a stream-ground water interface. National Ground Water Association, Association of Ground Water Scientists and Engineers, National Meeting, Las Vegas, NV, December
89. Johnson, A., Woessner, W. W. and Stanford, J. A., 2002. Preferential flow in the hyporheic zone of a large alluvial river. National Ground Water Association, Association of Ground Water Scientists and Engineers, National Meeting, Las Vegas, NV, December
88. Boer, B., Woessner, W. W. and O'Daniel, S. 2002. Analysis of subsurface features in an Oregonian floodplain using ground penetrating radar. National Ground Water Association, Association of Ground Water Scientists and Engineers, National Meeting, Las Vegas, NV, December
87. Vitale, M., Hinman, N. and Woessner, W. W., 2002. Effects of groundwater-surface water exchange on creek channel mineral deposits in a hydrothermal environment. National Ground Water Association, Association of Ground Water Scientists and Engineers, National Meeting, Las Vegas, NV, December
86. Arrigoni, A., Mertes, L., O'Daniel, S., Poole, G., Woessner W., Thomas, S., and Mason, J.. 2002. Characterizing diversity of thermal and hydrodynamic properties in waters of the Umatilla River, Oregon, and its floodplain. AGU. December.
85. Vitale, M., Hinman, H. and Woessner, W., 2002. Hydrological, geochemical and biological factors on silica deposition in a hot spring fed creek in Yellowstone National Park. MT AWRA, Livingston, MT
84. Woessner, W. W., 2002, **(INVITED)** Exchange of groundwater at the stream-floodplain interface. 11th Annual Conference Ground Water Resources Association of California. Newport Beach, CA, Sept.

83. Woessner, W. W., 2002, **(INVITED)** Occurrence, transport, and fate of pathogens in groundwater: Current conditions and policy implications. Council of Canadian Ministers of the Environment Workshop. Linking Water Science to Policy: Groundwater Quality. Toronto, March 21 and 22, 2002.
82. Woessner, W. W., 2001, **(INVITED)** Conceptualizing physical and chemical exchange at the floodplain and channel scale. Society of Environmental Toxicologists and Chemists, Baltimore, MD Nov.
81. Woessner, W. W. and Moore, J. N., 2001. Balancing act, conceptualizing arsenic fate at Milltown, Western Montana. Montana Am. Water Resources Association, October 4-5, Missoula, MT.
80. Reeves, D. M. and Woessner, W. W., 2001. Deciphering the Water Budget for wetlands supporting threatened Water Howellia, Swan Valley, Montana. Montana Am. Water Resources Association, October 4-5, Missoula, MT.
79. Boer, B. and Woessner, W. W., 2001. Preliminary impact assessment of septic system effluent discharge on the groundwater and surface water in Lolo, MT. Montana Am. Water Resources Association, October 4-5, Missoula, MT.
78. Johnson, M. M and Woessner, W. W., 2001. The fate of sewage effluent nutrients applied to coarse-grained soils by sprinkler irrigation: preliminary results. Montana Am. Water Resources Association, October 4-5, Missoula, MT.
77. Woessner, W. W. 2001, **(INVITED)**, New lessons from post audits? Proceedings of the MODFLOW 2001 and Other Modeling Odysseys. Eds. Seo, Poeter, Zheng and Poeter. IGWMC. Colorado School of Mines, Boulder, CO. Sept 11-14. (presentation prepared and sent. prevented from attending by events of Sept 11, 2001.)
76. Woessner, W. W. and Ball, P. N., 2001 **(INVITED)** The affect of aquifer heterogeneities v transport in coarse-grained floodplain sediments. NGWA Focus Conference, Portland, Feb.
75. Woessner, W. W., 2000, **(INVITED, FARVOLDEN DISTINGUISHED LECTURE)**, Characterizing, maintaining and remediating hydrogeologically supported physical and ecological functions of streams: Conceptualizing Groundwater exchange at the floodplain and channel scale. Dept. of Earth Science, Univ. of Waterloo, Waterloo, Ontario, Dec1.
74. Woessner, W. W., 2000, **(INVITED)**, Factors controlling viral transport in a floodplain aquifer influenced by pumping. Dept. of Earth Science, University of Waterloo, Waterloo, Ontario, Nov. 31.
73. Woessner, W. W., 2000, **(INVITED)**, Simulation of channel-groundwater exchange to enhance system conceptualization and interpretation of field data. Geol. Soc. of America National Meeting, Reno, NV. Nov.
72. Tyrrell, C.M., and Woessner, W. W., 2000, Groundwater-stream interaction in the placer mined watershed of Elk creek, MT. Geol. Soc. of America National Meeting, Reno, NV. Nov.

71. Reeves, D. M. and Woessner, W. W., 2000, Interface exchange of water in wetlands supporting the largest known population of Water Howellia, Swan Valley, Montana. Geol. Soc. of America National Meeting, Reno, NV. Nov.
70. Pacht, K. A., LaFave, J. I., and Woessner, W. W., 2000, An attempt to age-date young groundwater in the highly conductive Missoula aquifer, western, MT. Geol. Soc. of America National Meeting, Reno, NV. Nov.
69. Reeves, D. M. and Woessner W. W. and Heidel, B., 2000, Preliminary evaluation of the hydrology and hydrogeology of forested wetlands containing Water Howellia, western Montana. Abstracts of the Rocky Mountain Section of the Geological Society of America, April 2000, Missoula, MT, p. 28.
68. Tyrrell, C.M. and Woessner W., 2000, Groundwater-stream interaction in a placer mined watershed an investigation of Elk Creek, Montana. Abstracts of the Rocky Mountain Section of the Geological Society of America, April 2000, Missoula, MT, p. 28.
67. Woessner, W. W., 2000, Chemical and viral impacts to shallow groundwater from septic-system effluent, western Montana. Abstracts of the Rocky Mountain Section of the Geological Society of America, April 2000, Missoula, MT, p. 30.
66. Woessner, W. W. (**INVITED**), 1999, Virus transport under rapid groundwater flow, western Montana. CYCLE 1999-2000, Des Conférences du Centre d'Hydrogéologie, Univ. de Neuchâtel, Switzerland.
65. Woessner, W. W., 1999, Conceptualization and complexities of modelling groundwater-stream interaction at the near-channel scale. Proceedings of ModelCARE'99. ETH, Zurich, Switzerland,.
64. Woessner, W. W. , Ball, P. N., DeBorde, D. C. and Troy, T. L., 1999, The use of a mass balance approach to characterize virus attachment during transport in a coarse grained aquifer. International Symposium on Subsurface Microbiology, Vail, CO., August.
63. Ball, P. N., Holben, W. E., Woessner, W. W., Gsell T. C. and DeBorde, D. C., 1999, Assessing mass balance of transported bacteriophage in a septic flow field. National Meeting, Am. Soc. Microbiology, Chicago, IL, June
62. Woessner, W. W. (**INVITED**), 1999, Preparing the Anaconda and Milltown NRDA groundwater injury and quantification case: as told by the groundwater expert for the State of Montana. Restoring our Natural Resources: What Will It Cost? Public Land and Resources Law Review, Univ. of Montana Law School, March, 1999.
61. Woessner, W. W. (**INVITED**), 1999, Interactions of stream and fluvial plain ground- water systems: rescaling hydrogeologic thought, Pacific Northwest Focus Ground Water Conference, National Ground Water Association, Portland, OR, February.
60. Moore, J. N. and Woessner, W. W. (**INVITED**), 1999, Solute and solid phase relationships in the surface hyporheic zone of a metal contaminated stream, Silver Bow Creek, MT. EPA Workshop on Surface-water Ground-water Interaction, Denver, January.

59. Woessner, W. W. and Anderson, M. P., 1998, Advantages and disadvantages of teaching MODFLOW using pre- and post- processors. Ed. E. Poeter, C. Zheng and M. Hill. Proceedings of MODFLOW'98 International Conference, Colorado School of Mines, Golden, CO.,
58. Woessner, W. W., 1998 (**KEYNOTE**), Changing views of stream-ground-water interaction. Proceedings of American Institute of Hydrology/International Association of Hydrologists XXVIII Congress: Gambling with Groundwater, Physical, Chemical and Biological Aspects of Aquifer-Stream Relationships., Sept. 1998, Las Vegas, NV, American Institute of Hydrology, St. Paul, MN.
57. Woessner, W.W., Troy, T., Ball, P. and DeBorde, D.C., 1998, Virus transport in the capture zone of a well penetrating a high hydraulic conductivity aquifer containing a preferential flow zone: Challenges to Natural Disinfection, Proceedings of Source Water Protection International 98, Dallas Texas, April 28-30, National Water Research Institute.
56. Woessner, W.W. and DeBorde, D.C., 1998, Virus Transport in the floodplain groundwater of a headwater stream, western Montana, USA, Headwaters. Headwaters '98. Water Resources and Soil Conservation, Malino, Italy
55. DeBorde, D.C., Woessner, W.W., Ball, P. and Kiley, Q. and Troy, T., 1997, Virus Transport and survival in groundwater under high-velocity conditions. Am. Geol. Union National Meeting , San Francisco, CA.
54. Ball, P, Troy, T., Kiley, Q., Woessner, W.W. and DeBorde, D.C., 1997, Virus transport in a floodplain aquifer during pumping. Montana AWRA and University System Water Center, Annual Conference, October, Butte, MT
53. Woessner, W.W. (**INVITED**), 1997, Confirming observations and uncertainty in groundwater models. Montana Bureau of Mines Symposium. Montana Tech of the University of Montana, Butte, MT.
52. Woessner, W.W.(**INVITED**), 1997, Observations of virus behavior in sand and gravel aquifers. University of Waterloo Seminar Series. Waterloo, Ontario, Canada.
51. Kiley, Q. T., Bushur, J, Woessner, W. W., DeBorde, D. C. and Ball, P., 1996, Rapid transport of virus, bromide and rhodamine- WT in a floodplain aquifer. Geological Society of America National Meeting, Denver, CO.
50. Lauerman, B.C., Woessner, W. W. , DeBorde, D. C., and Ball, P., 1996, Results of a virus seeding experiment in an unconfined, cold-water, sand and gravel aquifer, Frenchtown, Montana.. 8th Biennial Symposium on Artificial Recharge of Groundwater, Arizona, Hydrological Society, Salt River Project, U. S. Water Conservation Laboratory, and Arizona Department of Water Resources, Tempe, Arizona.
49. Woessner, W. W., DeBorde, D. C., Ball, P., Bushur, J. M. and Kiley, Q. T., 1996, Virus transport in a heterogeneous, high-conductivity floodplain. Am. Water Resources Assoc./Montana Water Center Conference, Western MT College of the U of MT, Dillon, MT.

48. Lauerman, B. C., Woessner, W. W., DeBorde, D. C., and Ball, P., 1996, Results of a virus seeding experiment in an unconfined, sand and gravel aquifer, Frenchtown, Montana. Am. Water Resources Assoc./Montana Water Center Conference, Western MT College of the U of MT, Dillon, MT.
47. Shay, D. T., Woessner, W. W., and Moore, J. N., 1996, Water table fluctuations as a mechanism to release metals from a tailings-rich floodplain, Silver Bow Creek, Montana. Am. Water Resources Assoc./Montana Water Center Conference, Western MT College of the U of MT, Dillon, MT
46. DeBorde, D.C., Woessner, W.W., Ball, P., Busher, J. and Lauerman, B., 1996, Transport and fate of virus in the vicinity of pumping wells, National Water Research Institute, Los Angeles, April 20, 1996.
45. DeBorde, D.C. and Woessner, W.W, 1996, Transport and fate of viruses in the vicinity of pumping wells. One-Day Symposium: Findings of the Joint NWRI/USEPA Research Program. Virus Fate and Transport in a Porous Medium, March 11, 1996, Washington, D.C.
44. Woessner, W.W. (**INVITED**), DeBorde, D.C., Lauerman, B., and Ball, P., 1996, Virus transport in a cold, highly conductive aquifer: evaluation of a drainfield and seeded source. University of Nevada Joint Hydrology-Geology Symposium, March 10, 1996, Reno, Nevada.
43. DeBorde, D.C., Woessner, W.W., Ball, P., Busher, J. and Lauerman, B., 1995, Transport and fate of virus in the vicinity of pumping wells, National Water Research Institute, Los Angeles, October 14, 1995.
42. DeBorde, D.C., Lauerman, B., Woessner, W.W. (**INVITED**) and Ball, P., 1995, Occurrence and movement of viruses in groundwater impacted by a high school septic system, American Water Resources Association, Bozeman, MT, October 13, 1995.
41. Woessner, W.W., 1995, Good model-bad model, understanding the flow modeling process. Ed. J. Richey and J. Rumbaugh III, ASTM D-18 Soil and Rock, D18.21 Ground Water and Vadose Zone Investigations, Phil., PA, in press.
40. Woessner W. W., 1995, (**INVITED**), Cumulative impacts of septic systems on the Missoula Aquifer, Clark Fork River Symposium, April 28, 1995, Missoula, Montana.
39. Woessner, W. W., 1994, (**INVITED**), Synergistic solution for waste remediation, do we agree on goals for remediation? how clean is clean enough/ are we spending the dollars wisely. Montana University Water Resources Center Workshop, Bozeman, MT, June 7.
37. Woessner, W. W., 1994, Answered or unanswered questions, what does the regulator get: Assessing flow modeling results. The 1994 Pacific Northwest/Oceania Conference-Assessment of Models for Groundwater Resources Analysis and Management, March 21-23, Water Resources Center, University of Hawaii, Oahu Hawaii.

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PARTICIPATION ON BOARDS, PANELS OR SYMPOSIA

Board Member, 2005 California Bay-Delta Authority Water-Management Science Board

Panel Member, 2004-2006 National Research Council Committee on U.S.G.S. Water Resources Research, Water Science Board, National Academe of Sciences

Panel Member, 2006. Groundwater Conservation Advisory Council, East Lansing, MI, Dec

Panel Member, 2004-2006 National Research Council Committee on River Science at the U.S.G.S., Water Science Board, National Academe of Sciences

Candidate, 2003- on the Fulbright Senior Specialists Roster. Approved by J. William Fulbright Foreign Scholarship Board (FSB), the Bureau of Education and Cultural Affairs of the Department of State (ECA), and the Council for International Exchange of Scholars (CIES) to be considered for grants offered by overseas programs requiring expertise in my area of specialty.

Director, 2003-2006 Acting Director of the University of Montana Center for Riverine Science and Stream Re-naturalization

Advisory Board Member, 2003-2006 Advisory Board, Italian Journal of Engineering Geology and Environment: Geologic risks, Site investigation, Slope stability, Groundwater research, Water resources management, Economic Geology, Applied geophysics, Land use management, Rock and soil characterization

Board Member, 2001-2004 Board of Directors, Association of Ground Water Scientists and Engineers, National Ground Water Association (two terms)

Workshop Faculty, 2003. Science for Judges Workshop. Dividing the Waters: A dialog for judges, masters and referees. Snowbird, Utah, April 28, 29. Western Supreme Court, Water Judges, Water Masters and Water Referrers.

Technical Committee 2003,2006, 2008 MODFLOW 2003 and More, International Ground Water Modeling Center Conference, Colorado School of Mines, Sept., MODFLOW and Moore 2006, International Ground Water Modeling Center Conference, Colorado School of Mines, May.

Co Chair, 2003. Association of Ground Water Scientists and Engineers National Meeting December 2002, Las Vegas, National Ground Water Association

Workshop Member, 2001, Groundwater Fluxes Across Interfaces. National Research Council, Water Science and Technology Board, Committee on Hydrologic Sciences, May .

Panel Member: 2001 Site Review Canadian Natural Sciences and Engineering Research Council Grant-Univ. of Waterloo, Canada

Panel Member: EPA Workshop on Predicting Microbial Contamination of Groundwater Systems. July 10 and 11, 1996, Arnold and Mabel Beckman Center of the national Academy of Sciences and Engineering, Irvine, CA.

Panel Member, Riparian Ecology Workshop, EAWAG, Forschungszentrum fur Limnologie, Kastanienbaum, Switzerland, 1996

Panel Member, Department of Environmental Quality Task Force on Non-Degradation, 1995-1996.

Panel Member, Review of the Waterloo Groundwater Center of Excellence, 1994, for the Office of Technology, Ontario Government, Canada.

Panel Member, Coupling Geosphere Transport Models with Regulatory Policies, 1994, Georgia Research Alliance, University of Georgia.

National Research Council Committee on Ground Water Recharge in Surface-Mined Areas, 1989-90

Technical Chairman, Headwater Hydrology Symposium, AWRA, June, 1989

Ad-Hoc committee on a Hydrogeology Division Scholarship, Geological Society of America, 1987-88

Clark Fork River Committee, Office of the Governor, Helena, 1987 to 1988

Organizing Committee. Clark Fork River Symposium, 1985

Governor's Groundwater Advisory Council, State of Montana 1983-85

Northwest Scientific Association--Montana Academy of Sciences Conference. Organizing Committee--Geology and Environmental Science. Missoula, MT, 1984.

Organizing Committee. 13th Rocky Mountain Groundwater Conference. . Great Falls, MT, 1984.

National Resource Council Committee on Groundwater Resource in Relation to Coal Mining, Parent Committee. Chairman, Subcommittee on Western Coal Development, Editorial Subcommittee member, 1979-81.

PROFESSIONAL ASSOCIATION MEMBERSHIP AND SERVICE

Reviewer. European Science Foundation 2002

Reviewer-Panel Member. Natural Sciences and Engineering Research Council of Canada 2001present

Board of Directors, Association of Ground Water Scientists and Engineers (11000 members), 2001-2003

Associate Editor, *Ground Water*, 1996 to 1998.

Reviewer National Science Foundation, Continuing

Reviewer National Research Council, Continuing

Reviewer, *Water Resources Research*, AGU, 1995 to present.

Reviewer Ground Water 1996 to present

Rocky Mountain Hydrogeology Division Representative, Geol. Soc. of America, 1993 to 2002

Fellow Geological Society of America, 1998

American Water Resources Association, 1974 to present.

National Ground Water Association, 1974 to present.

Sigma Gamma Epsilon, Honorary Earth Science, 1971 to 1973

American Geophysical Union, 1982 to present.

Sigma Xi, 1982 to present.

Geological Society of America, 1976 to present

American Association for the Advancement of Science, 1994-1995, 2004- present.