

:: Charles M. Burt ::



Chairman of the Board, ITRC

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Ph.D., P.E., CID

- Author or co-author of 120 articles and study guides, related to on-farm irrigation, canal modernization, and efficiency (See below for a partial list of publications).
- First chairman of the IA Certification Board.
- Extensive field and design experience in drip, sprinkler, and surface.
- Extensive field and theoretical experience in canal / pipeline / pump modernization.
- Work experience in 25 countries.
- Registered Civil Engineer and Agricultural Engineer, California.
- Registered Professional Engineer, Utah.
- Person of the Year (1997) - The Irrigation Association.
- Person of the Year (2000) - California Irrigation Institute.

Professor, BioResource and Agricultural Engineering Department

Teaches the following University irrigation classes:

- BRAE 340 Irrigation Water Management
- BRAE 331 Irrigation Theory
- BRAE 533 Irrigation Project Design
- BRAE 438 Drip Irrigation
- BRAE 414 Irrigation Engineering
- BRAE 440 Agricultural Irrigation Systems
- BRAE 405 Chemigation

Education:

- B.S., Soil Science, California Polytechnic State University, San Luis Obispo, CA
- M.S., Irrigation and Drainage Engineering, Utah State University, Logan, UT

- Ph.D., Engineering, Utah State University, Logan, UT

Examples of publications by Dr. Charles Burt:

- Burt, C.M., G. Stringham and D. James. 1976. Increasing Yields on Recently Graded Land Through Proper Phosphate Fertilization. Utah Science. Reprinted in Nov/Dec 1976 issue of Irrigation Age.
- Burt, C.M. and J. Keller. 1976. Very Low Pressure Sprinkler Irrigation. ASAE Paper No. 76-2517. , and Utah State University 2111(d)-12 bulletin. Dept. of Agricultural and Irrigation Engineering.
- Merriam, J., Shearer and C.M. Burt. 1980. Evaluating Irrigation Systems and Practices. Chapter 17 in the ASAE Monograph No. 3. M.E. Jensen, editor. Pp. 721-762.
- Burt, C.M. and J. Lord. 1981. Demand Theory and Application in Irrigation District Water Delivery. Proceedings of the ASAE Specialty Conference on Irrigation Scheduling, held at Chicago, Ill.
- Burt, C.M. 1983. Regulation of Sloping Canals by Downstream Regulation Control. ASAE Paper No. 83-2582. Presented at the winter meeting of ASAE in Chicago, Ill.
- Burt, C.M., R. Walker and S. Styles. 1992. Irrigation System Evaluation Manual - rev 1992. A comprehensive, documented software package for evaluation of agricultural irrigation systems. Funded by the OWC, Calif. DWR. Pub. by ITRC, Dept. of Agricultural Engineering, Cal Poly, San Luis Obispo, Calif.
- Burt, C.M. and G. Gartrell. 1993. Irrigation Canal - Simulation Model Usage. 1993. Journal of Irrigation and Drainage Engineering. 119 (4):631-636.
- Plusquellec, H., C.M. Burt and H. Wolter. 1994. Modern Water Control in Irrigation - Concepts Issues and Applications. World Bank Technical Paper Number 246. Irrigation and Drainage Series. The World Bank. Washington, D.C.
- Burt, C.M. 1994. The Irrigation Consumer Bill of Rights. Irrigation Journal. Vol 44(4): 32-33.
- Burt, C.M. and S. Styles. 2000. Drip and Microirrigation for Trees, Vines, and Row Crops, with special sections on buried drip. Published by the ITRC, Cal Poly, San Luis Obispo, CA. ISBN 0-9643634-2-9. 292p.
- Burt, C.M. 1995. The Surface Irrigation Manual - A Comprehensive Guide to Design and Operation of Surface Irrigation Systems. Waterman Industries. Exeter, CA. ISBN 0-9639016. 373 p.
- Burt, C.M. 1995. Guidelines for Establishing Irrigation Scheduling Policies. Theme V: Interaction Between Water Delivery and Irrigation Scheduling. ICID/FAO Workshop on Irrigation Scheduling: From Theory to Practice. Sept. 12-13. Rome, Italy.
- Burt, C.M., K. O'Connor and T. Ruehr. 1995. Fertigation. Published by the ITRC, Cal Poly, San Luis Obispo, CA. ISBN 0-9643634-1-0. 326 p.
- Burt, C.M. and S. Styles. 1996. Modern Water Control and Management Practices in

Irrigation: Impact on Performance. FAO Technical Papers. Water Report 19. ISSN 1020-1203. 223 p.

Burt, C.M., R. Mills, R. Khalsa, and V. Ruiz. 1998. Improved Proportional-Integral (PI) Logic for Canal Automation. Journal of Irrigation and Drainage Engineering.

- Burt, C.M., A. Clemmens, T. Strelkoff, K. Solomon, R. Bliesner, L. Hardy, T. Howell, and D. Eisenhauer. 1998. Irrigation Performance Measures - Efficiency and Uniformity. Journal of Irrigation and Drainage Engineering 123(6):423-442.
- Burt, C.M. 2004. Rapid Field Evaluation of Drip and Microspray Distribution Uniformity. Kluwer Academic Publishers. Irrigation and Drainage Systems 18:275-297.
- Burt, C.M., A.J. Mutziger, R.G. Allen, and T.A. Howell. 2005. Evaporation Research - A Review and Interpretation. Journal Irrig. Drain. Engr. 131(1): 37-58.
- Mutziger, A.J., C.M. Burt, D.J. Howes, and R.G. Allen. 2005. Comparison of Measured and Modified FAO 56 Modeled Bare Soil Evaporation. Journal Irrig. Drain. Engr. 131(1): 59-72.
- Allen, R.G., A.J. Clemmens, C.M. Burt, K. Solomon, and T. O'Halloran. 2005. Prediction Accuracy for Projectwide Evapotranspiration Using Crop Coefficients and Reference Evapotranspiration. Journal Irrig. Drainage. Engr. 131(1): 24-36.
- van Overloop, P.J., J. Schuurmans, R. Brouwer, and C.M. Burt. 2005. Multiple Model Optimization of Decentralized PI-Controllers on Canals. Journal Irrig. Drain. Engr. 131(2): 190-196.

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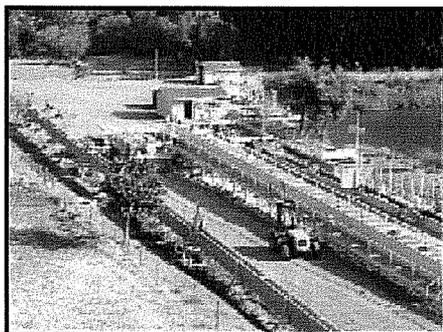
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:: About ITRC ::

ITRC is a center of excellence housed within the BioResource and Agricultural Engineering (BRAE) Department of California Polytechnic State University (Cal Poly) in San Luis Obispo. The linkage to the BRAE Department is unique among irrigation centers – ITRC's organization was specifically developed as such to ensure long-term positive benefits to Cal Poly's academic irrigation teaching program – which provides long-term benefits to California and the nation.



Water Delivery Facility

ITRC's modern engineering offices, in addition to providing professional resources for ITRC staff, also house two training rooms and office space for both graduate and undergraduate students. Outdoors is the unique Water Delivery Facility to demonstrate pumps, pump testing, flow measurement, SCADA, and canal automation. Additionally, the outdoor Irrigation Practices Field contains a complete assortment of on-farm and landscape irrigation systems and equipment.

Cal Poly has a long tradition of providing pragmatic irrigation training and technical expertise to industry, farmers, irrigation districts, and state/federal agencies. ITRC was officially formed in 1989, and continues to be self-supporting through contracts. Its work is approximately 65% direct technical assistance, 15% training, and 20% research (both applied government-funded, and industry). Focus areas include:

- Irrigation projects (irrigation district modernization, water balances, river basin return flow issues, SCADA, canal automation, pump automation, flow measurement, energy consumption, and efficiency);
- Farm irrigation (drip, surface, and sprinkler irrigation; drainage; salinity; energy consumption; irrigation evaluations; evapotranspiration; pumps);
- Landscape (primarily development of urban water conservation programs).

The center is run by Dr. Charles Burt (Chairman and Founder) and Dr. Stuart Styles (Director) – both recognized internationally as irrigation experts – with an excellent professional staff of 13 persons. Additionally, 15-25 students are hired at any one time to provide support. ITRC utilizes specialists from within and outside the university to provide additional expertise. As an example, ITRC has worked for several years with an international team to develop sophisticated canal automation algorithms.

ITRC is active throughout the western U.S. and the world in irrigation research, technical assistance, and environmental/energy assessments. For example:

- ITRC has numerous active irrigation district modernization projects throughout California, as well as in Washington, northern Oregon, Colorado, Arizona, Idaho, and Oklahoma. Most involve some aspect of energy conservation or environmental improvement while simultaneously modernizing irrigation districts.
- The World Bank, FAO/UN, UNDP, and others fund ITRC to provide expertise on irrigation modernization in China, Philippines, Vietnam, Kyrgyzstan, Azerbaijan, India, Pakistan, Mexico, and many other countries.
- Manufacturers hire ITRC for a wide variety of projects ranging from testing of polymers in irrigation on field trials, to determining friction on large diameter pipes, to examining the performance of new

sprinklers and drip tape under both field and laboratory conditions.

- ITRC has been a major innovator in water-related peak load reduction and electrical energy conservation for the California Energy Commission, utilities, and others.
- ITRC actively participates in various water-related technical sessions and workshops of professional organizations such as the US Committee on Irrigation and Drainage, and the American Society of Civil Engineers.

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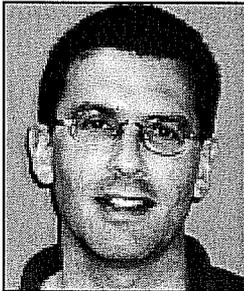
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August 15, 2007

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Lawrence Band



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[Curriculum Vita](#) (HTML format)

Related links:
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Research

Our research group is primarily interested in the structure, function and dynamics of watershed systems. In this work we combine field measurement and observation of hydrological and ecological variables with the development and application of distributed simulation models, GIS and remote sensing techniques. Our projects are particularly concerned with the integration and coupling between water, carbon and nutrient cycling and transport with watersheds, and the interactions of human individual and institutional behavior as part of watershed ecosystems. Currently we are working in a range of watersheds within forested, agricultural and urban environments. This encompasses a set of LTER sites, as well as sites within and near Chapel Hill, NC. Our major research site is in the Baltimore Ecosystem Study (www.beslter.org). Previous work has included work in northern Manitoba, central Saskatchewan, central Ontario, the Loess Plateau of northern China and the Pacific Northwest.

An emphasis in our work in GISci is the representation of watersheds as hierarchical systems based on a geomorphic framework of the landscape, and including the integrated patterns of topography, soils and surface materials, arranged within a progressively nested subcatchments, hillslopes, bottomlands and channels. Remote sensing techniques are used and developed to extract key attributes of vegetation canopies, along with anthropogenic features. Digital terrain analysis is keyed towards the extraction of the full flowpath network, and the partition of the catchment into the component geomorphic hierarchy features.

Recent Publications

D.L. Tenenbaum, L.E. Band, C.L. Tague, S. Kenworthy, 2006. Analysis of soil moisture patterns in forested and suburban catchments using high resolution photogrammetric and

LIDAR digital elevation datasets. *Hydrological Processes*, v.20(2), p.219-240..

Band, L.E., M. Cadenasso, S. Grimmond, M. Grove, S.T. Pickett, 2005. Heterogeneity in Urban Ecosystems: Pattern and Process. In, Lovett, G.M., C.G. Jones, M.G. Turner, and K.C. Weathers, editors. *Ecosystem Function in Heterogeneous Landscapes*. Springer-Verlag, NY ().

C.L. Tague, L.E. Band and J. Franklin 2005. Terrestrial Ecosystems. Ch.H109 in, eds. M. Anderson, J. McDonnell, *Encyclopedia of Hydrology*, John Wiley.

L.E. Band and C. Tague 2005. Feedbacks and Coupling between Water, Carbon and Nutrient Cycling at the Hillslope Scale. Ch. 4.10, in Axel Bronstert, Jesus Carrera, Pavel Kabat, Sabine Lütke-meier (Eds), *Coupled Models for the Hydrological Cycle - Integrating Atmosphere, Biosphere, and Pedosphere*. Springer-Verlag, 2005

- Song, C. and L.E. Band, 2004. MVP: A Model to Simulate the Spatial Patterns of Photosynthetically Active Radiation Under Discrete Forest Canopies. *Canadian Journal of Forest Research*, v.34, p.1192-1203.
- Groffman, P.M., N.L. Law, K.T. Belt, L.E. Band and G.T. Fisher. 2004. Nitrogen fluxes and retention in urban watershed ecosystems. *Ecosystems*, v.7, p.393-403.
- Law, N.L., L.E. Band, J.M. Grove, 2004. Nitrogen input from residential lawn care practices in suburban watersheds in Baltimore County, MD. *Journal of Environmental Management*, 47(5), 737-755.
- Tague, C.L., L.E. Band, 2004. RHESSys: Regional Hydro-Ecologic Simulation System—An Object-Oriented Approach to Spatially Distributed Modeling of Carbon, Water, and Nutrient Cycling. *Earth Interactions* 2004 8: 1-42.
- Groffman, P.M., D.J. Bain, L.E. Band, K.T. Belt, G.S. Brush, J.M. Grove, R.V. Pouyat, I.C. Yesilonis, W.C. Zipperer, 2003. Down by the riverside: Urban riparian ecology. *Front Ecol Environ*, 1(6), 315-321.
- Mackay, D.S., S. Samanta, R.R. Nemani, and L.E. Band. 2003. Multi-objective parameter estimation for simulating canopy transpiration in forested watersheds. *Journal of Hydrology* v.277, 230-247.
- Creed, I. F., C. G. Trick, L. E. Band, I. K. Morrison 2002. Characterizing the Spatial Pattern of Soil Carbon and Nitrogen Pools in the Turkey Lakes Watershed: A Comparison of Regression Techniques. *Water, Air, & Soil Pollution*, v.2, p.81-102.
- Groffman, P.M., N.J. Boulware, W.C. Zipperer, R.V. Pouyat, L.E. Band, M.F. Colosimo 2002. Soil nitrogen cycle processes in urban riparian zones. *Environmental Sciences and Technology*, v.36, p.4547-4552.
- Wing, S., S. Friedman and L. Band 2002. The potential influence of flooding on confined animal feeding operations in eastern North Carolina. *Environmental Health Perspectives*, v.110, p.387-391.
- L.E. Band, C.L. Tague, P. Groffman and K. Belt, 2001. Forest ecosystem processes at the watershed scale: Hydrological and ecological controls of nitrogen export. *Hydrological Processes*, v.15, p.2013-2028.
- C.L. Tague and L.E. Band, 2001. Simulating the impacts of road construction and forest harvesting on hydrologic response. *Earth Surface Processes and Landforms*, v26, p.135-151.
- C.L. Tague and L.E. Band, 2001. Evaluating explicit and implicit routing for watershed, hydroecological models of forest hydrology at the small catchment scale. *Hydrological Processes*, v.15, p.1415-1439.
- L.E. Band, C.L. Tague, S.E. Brun, D.E. Tenenbaum, R.A. Fernandes 2000. Modeling watersheds as spatial object hierarchies: Structure and dynamics. *Transactions in Geographic Information Systems*, v.4, p.181-196.
- S.E. Brun and L.E. Band 2000. Simulating runoff behavior in an urbanizing watershed. *Computers, Environment and Urban Systems*, v.24, p.5-22.
- Walko, R.L., L.E. Band, J. Baron, T.G.F. Kittel, R. Lammers, T.J. Lee, R.A. Pielke, Sr., C. Taylor, C. Tague, C.J. Tremback, P.L. Vidale 2000. Coupled atmosphere-biophysics-

hydrology models for environmental modeling. *Journal of Applied Meteorology*, v39, p.931-944.

J.S Baron, M.D. Hartman, L.E. Band and R.B. Lammers 2000. Sensitivity of a high-elevation Rocky Mountain watershed to altered climate and CO₂. *Water Resources Research*, v.36, p.89-100.

Teaching

I teach courses in hydrology, earth surface processes, environmental modeling, biogeoscience and GISci. My teaching has included additional courses in soils, remote sensing, quantitative methods at UNC, University of Toronto and Hunter College (CUNY).

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Date of Last Up-date: May, 2007

CURRICULUM VITAE

A. BIOGRAPHICAL INFORMATION

1. Personal

Name: Lawrence E. Band

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Department of Geography
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University of North Carolina
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fax: 919-962-1537
Email: lband@email.unc.edu

2. Degrees

Ph.D., 1983, Geography, University of California, Los Angeles "Measurement and simulation of hillslope development", Supervisor: Dr. A.R. Orme

M.A., 1979, Geography, University of California, Los Angeles
"Environmental constraints on the development of small, headwater stream networks", Supervisor: Dr. A.R. Orme

B.A., Geography, S.U.N.Y. at Buffalo, 1977

3. Employment

2002 - present	Chair, Department of Geography, UNC
1998 - present	Voit Gilmore Distinguished Professor of Geography Department of Geography University of North Carolina - Chapel Hill
1994 - 1998	Professor, Department of Geography, Graduate Faculty of Forestry, University of Toronto
1989 - 1994	Associate Professor, Department of Geography, University of Toronto
1987 - 1989	Assistant Professor, Department of Geography, University of Toronto
1983 - 1987	Assistant Professor, Department of Geology and Geography, Hunter College and Graduate Faculty, City University of New York
1981 - 1983	Lecturer, Department of Geography and Environmental Studies, San Francisco State University

4. Honors and Awards

- 1985 Chancellor's Distinguished Service Award, City University of New York
- 1985 NASA-ASEE Summer Faculty Fellowship, Ames Research Center, Moffett Field, California
- 1984 NASA-ASEE Summer Faculty Fellowship, Ames Research Center, Moffett Field, California
- 1994 Dean's Excellence Award, Faculty of Arts and Science, University of Toronto
- 1996 Dean's Excellence Award, Faculty of Arts and Science, University of Toronto

5. Professional Affiliations and Activities

- 1986-1987 NASA Topographic Science Working Group
- 1988 NASA Shuttle Image Radar-C and EOS/SAR Review Panel
- 1986-1989 Consultant to New York City Department of Parks and Recreation on three different projects advising on park resource management, resource inventory, and erosion and runoff control.
- 1990 Consultant to Legal Department, City of Toronto for court cases at Ontario Municipal Board on challenges to ravine designation pursuant to the City of Toronto Ravine Control By-Law
- 1990-1991 NASA Global Topography Mission Working Group
- 1990 NASA Soil Science Steering Group
- 1990 IGBP/IAHS/IHP Working Group on Plant-Water Interactions in Large Scale Hydroecological Modeling
- 1992-1998 Consultant to Ontario Ministry of Natural Resources for Landscape Ecology of Old Growth Forests, regional forest productivity, ecoregionalization.
- 1992-1993 Visiting Scientist, CRC for Catchment Hydrology, CSIRO, Canberra, Australia
- 1994-present Member, AGU Surface Water Hydrology Committee
- 2000-2003 Chair, AGU Surface Water Hydrology Committee
- 1999 Member NASA AO-1 Review Team
- 2000 Hydrology Editor, Encyclopedia Britannica
- 2001 Co-organized and chaired AGU Chapman Conference on Hillslope Hydrology, Bend Oregon
- 2001-2004 Deputy Editor, Surface Water Hydrology, Water Resources Research
- 2002 Consultant, British Columbia Ministry of Forests, Ecoregionalization
- 2002-2004 Chair, Consortium of Universities for the Advancement of Hydrologic Science Committee on Hydrologic Observatories
- 2005-2007 Member, NRC Committee on Integrated Observations for Hydrologic and Related Sciences
- 2005 Member, Review Team for the Chesapeake Bay Watershed Model, Chesapeake Bay Foundation
- 2006 Organized and chaired Spring AGU Union Sessions on Urbanization Impacts on the Environment
- 2006-2007 Member, Review Team for the Everglades Land Model, South Florida Water Management District
- 2007- Member, NRC Committee: Reducing stormwater discharge contributions to water pollution

1990-1991.

Dr. Soren Brun, University of Toronto, Physical Geography, 1998-1999.
Dr. Christina Tague, University of Toronto, Physical Geography, 1999.
Dr. Chris Kees, UNC, Environmental Sciences and Engineering, 2001-2002.
Dr. Steve Kenworthy, Johns Hopkins University, Geography, 2001-2002.
Dr. Daehyok Shin, UNC Chapel Hill, Geography, 2006.
Dr. TC Hales, University of Oregon, 2006.

E. UNIVERSITY ADMINISTRATIVE POSITIONS AND OTHER UNIVERSITY SERVICE

Science Curriculum Renewal, Hunter College, CUNY, 1985-1986
Graduate Coordinator - Dept. of Geography, University of Toronto, 1994-1998
Member, Arts & Sciences Promotion Committee, University of Toronto, 1995-1998
Member, School of Grad. Studies, U. Toronto, Div. II Degree Comm. 1994-1996
Member, U. Toronto, University Research Advisory Board 1995-1998
Member, Faculty Steering Committee, Carolina Environment Program 1998-
Member, Executive Committee, Carolina Environment Program 1999-
Chair, Department of Geography, UNC July 2002 - present
Chair, UNC A&S Committee on Distance Learning, 2007

F. OTHER RELEVANT INFORMATION

Reviewer, Journal of Geology, Water Resources Research, Catena, Annals of the American Association of Geographers, Photogrammetric Engineering and Remote Sensing, IEEE Transactions on Remote Sensing and Geosciences, Artificial Intelligence in Natural Resources, Hydrological Processes, Quaternary Research, Computers in Geoscience, Soil Technology, Geographical Analysis, Journal of Hydrology, International Journal of Geographic Information Systems, Computers Environment and Urban Systems, Earth Surface Processes, Journal Vegetation Science, Transactions in GIS.

Reviewer, National Aeronautics and Space Administration, Branches of Global Biology and Hydrology, Solid Earth Science, grant proposals, National Science Foundation, grant proposals, NSERC, grant proposals, NERC, grant proposals, NOAA, grant proposals, Australian Research Council.

GEOG 10 - Introduction to Physical Geography
 GEOG 141 - Watershed Systems
 GEOG 140 - Earth Surface Processes
 GEOG 192 - Applications in Watershed GIS
 GEOG 210 - Advanced Physical Geography - Biogeoscience
 GEOG 308 - Graduate Seminar in Physical Geography

University of Toronto

GGR 205F - The Soils That Support Us
 GGR 206S - Introduction to Hydrology
 GGR 301F - Quantitative and Environmental Geomorphology
 GGR 373F - Geographic Information Processing
 GGR 461S/1911S - Remote Sensing of Environment
 GGR 462S/1914 - Geographic Information Systems

Primary Graduate Student Supervision

Masters

Richard Lammers	MSc.	Completed 1990.
D. Scott Mackay	MSc.	Completed 1990.
Pitman Patterson	MSc.	Completed 1990.
Christina Tague	MSc.	Completed 1994.
David Baldwin	MSc.	Completed 1997
Anastasia Svirejeva	Msc.	Completed 1997
Sandy Maunz	Msc.	Completed 2002
Catherine Shields	MA	Continuing
Tamara Mittman	MA	Continuing
Katerina Savvas	Msc.	Continuing

Doctoral

Axing Zhu	Phd.	Completed 1994 - Professor, University of Wisconsin
Richard Lammers	Phd.	Completed 1998 - Res. Assoc, U.New Hampshire
Irena Creed	Phd.	Completed 1998 - Assoc. Professor, University of Western Ontario
Richard Fernandes	Phd.	Completed 1999 - Res. Scientist, Canada Centre for Remote Sensing, Ottawa.
Christina Tague	Phd.	Completed 1999 - Assist. Professor, Bren School of the Environment, U. Cal. Santa Barbara
Tongzhin Zhu	Phd.	Completed 1998 - Assoc. Professor, University of Minnesota, Duluth
Scott Mackay	Phd.	Completed 1997 - Assoc. Professor, University of Buffalo
Neely Law	Phd.	Completed 2003 - Center Watershed Protection
David Tenenbaum	Phd.	Completed 2004 - Assistant Professor, U. Mass. Boston
Laura Jackson	Phd.	Completed 2005 - Environ Protection Agency
Daehyok Shin	Phd.	Completed 2005 - Post-doc, UNC
Monica Lipscomb	Phd.	Continuing
Taehee Hwang	Phd.	Continuing
Tony Randolph	Phd.	Continuing
Yuri Kim	Phd.	Continuing

Post-Doctoral Fellows

Dr. Ramakrishna Nemani, Forest Ecology, Meteorology and Remote Sensing

Modeling flowpath impacts on nitrogen export in urbanizing watersheds, University of Maryland, Baltimore County, April, 2000.

Monitoring and modeling of watersheds along an urbanizing gradient: The Baltimore LTER, Department of Geography and Environmental Engineering, The Johns Hopkins University, March, 2001.

Integrated modeling of urbanizing ecosystems, CRC for Catchment Hydrology, Canberra, Australia, August, 2001.

Ecosystem approaches to urbanizing watersheds, Keynote Presentation at the Metropolitan Water Managers Council, Baltimore, MD., November, 2001.

Ecosystem approaches to urban watersheds: Annual EDWARD J. TAAFFE COLLOQUIUM SERIES Speaker, Ohio State University, February, 2002.

Coupling water, carbon and nitrogen cycling with variable source area dynamics in forested and urbanizing catchments. LTER Science Meeting, Sevilleta Long Term Ecological Research Site, New Mexico, April, 2002

Integrated watershed simulation of linked water, carbon and nitrogen cycling: Frontiers in Geoscience Lecture, Los Alamos National Laboratory, May 2002.

Hydroecology of urban ecosystems: Spring Meetings of the AGU, May, 2002, Washington.

Use of MODIS to quantify ecosystem drought impacts: Annual Meetings of the AAG, February 2003, New Orleans.

Integrated water, carbon and nutrient cycling in urban watersheds. Distinguished Visitor Series, Department of Geography, University of Maryland, March 2003.

Invited lecture at 10th Cary Conference on Ecosystem Heterogeneity, Millbrook, NY, April 2003: Heterogeneity in urban ecosystems.

Invited Plenary Lecture: Transdisciplinary approaches to urban ecosystems: Hydroecology in the 'burbs. International Association of Landscape Ecology, March 30-April 2, 2004, Las Vegas, Nevada.

The Baltimore Ecosystem Study: Lessons for Hydrologic Observatories. Invited lecture, Oregon State University, May 2005.

Invited Lecture: Integrated water, carbon and nutrient cycling in the 'burbs. University of Buffalo, October 2005.

Invited Lecture: A tale of three catchments: Coupling water and nitrogen cycling in the Baltimore Ecosystem Study, January 2006. University of South Carolina.

D. LIST OF COURSES

University of North Carolina

"Simulation modeling of hillslope form with reference to time-independent properties", Department of Geography, Universite de Montreal, 1983.

"Stream networks, digital elevation models and geographic information systems", Department of Geography, Rutgers University, 1984.

"Hydrologic information systems and topographic networks", NASA-Ames Research Center, 1984.

"Digital terrain models: implications for drainage basin research", Department of Geography, S.U.N.Y. at Albany, 1985.

"Mesure et simulation des versants", 53e Congres de l'Association Canadienne-Francaise pour l'Avancement des Sciences, Chicoutimi, Quebec, 1985.

"Numerical simulation of lateral stream migration", IGU Workshop on Theoretical Geomorphology, Aachen, West Germany, 1986.

L.E. Band and V.B. Robinson, "Automated construction of a hydrologic information system from digital elevation data", Workshop on Geographical Information Systems for Environmental Protection, January 22-23, Environmental Research Center, University of Nevada, Las Vegas, 1986.

L.E. Band and E.F. Wood, "Computer graphics for distributed hydrologic modeling", Spring Meetings of the American Geophysical Union, Baltimore, 1986.

L.E. Band "Current examples of water and soil dynamics", NSF Workshop on Super-computers in Landscape Ecology, September 14-17, Pingree Park, Colorado, 1986.

L.E. Band "Digital terrain analysis and variable source area simulation", SUNY at Buffalo, 1986.

Plenary talk on Integrated Watershed Simulation. Given to the American Society of Limnology and Oceanography, October, 1994, Leesburg, Va.

Alternative methods of climate change impact assessment. Given to the Climate Adaptation Group, AES, Burlington, ONT, March, 1995.

Scaling issues in forest water and carbon budgets. Gordon Conference on Forest Hydrogeochemistry, NH, August, 1995.

Nitrate flushing in northern hardwood watersheds. Institute for Ecosystem Studies, Millbrook, NY, November, 1995.

Nitrate export from forested catchments. Workshop on Chesapeake Bay Watershed Nitrogen Cycling. University of Maryland, Frostberg, June 1997.

Integrating biophysical and socioeconomic processes in an urbanizing watershed model, University of Delaware, November, 1998.

Simulation modeling of integrated biophysical and socioeconomic processes in the Baltimore Ecosystem Study, Annual Trewartha Lecture: University of Wisconsin, April, 1999.

Hydrological and ecological controls on catchment nitrogen export, Lamont-Doherty Geological Observatory, Columbia University, April 2000.

nitrogen loading in the Coweeta LTER. Poster presentation at Mid-Atlantic Ecological Society of America Meetings, Baltimore, March 2005.

Band, L E, C. Tague, P. Groffman, S. Kaushal, S. Kenworthy 2005. Coupling of Hydrologic and Ecosystem Nutrient Cycling in Forest and Suburban Catchments. Paper given at the Fall Meetings of the American Geophysical Union, San Francisco.

Shin, D. Lawrence E. Band, and Taehee Hwang, 2005. Toward more usable environmental model: an experience to integrate RHESSys with CatchLab, Annual Meeting Program of Association of American Geographers, Denver,

Band, LE, 2006. Drought vulnerability in North Carolina: Low flow response to expected climate and land use change in water supply watersheds. Annual Meetings of the Association of American Geographers, Chicago.

Band, L.E., Shin, S., Hwang, T., 2006. Integrated climate and geomorphic controls on space-time variability in coupled canopy and soil water and carbon cycling in an experimental watershed Annual Meeting of the European Geophysical Union, Vienna.

Shin, D., L.E. Band, 2006. Emergent Properties and Dominant Processes with Temporal Scales: Application of Nonlinear System Identification Method for Rainfall-Runoff Modeling Paper given at the Spring Meetings of the American Geophysical Union, Baltimore.

Shin, D. and Lawrence E. Band, 2006. Emergent properties and dominant processes with changing scales: an application of nonlinear system identification method for rainfall-runoff modeling, 2nd Interagency Conference on Research in the Watersheds, USDA SRS Coweeta Hydrologic Laboratory.

Shields, C., L.E. Band, P.S. Groffman, G. Fisher and S. Kaushal 2006. Temporal distribution of nitrogen loading: an urban-rural gradient? Paper given at the Spring Meetings of the American Geophysical Union, Baltimore.

Hwang, T., D. Shin, and L.E. Band 2006. Signals Of Hydrologic Responses To Climatic Changes And External Disturbances. Poster given at the Spring Meetings of the American Geophysical Union, Baltimore.

Band, L.E., Smith, M., Hwang, T., Tague, C. and Groffman, P. 2006. Ecohydrologic pattern optimization at the hillslope scale: Implications for ecosystem management and restoration in the Anthropocene. Paper given at the Fall Meetings of the American Geophysical Union, San Francisco.

Shin, D, Hwang, T, Band, L E 2006. How to detect vegetation controls on evapotranspiration loss and improve physical process modeling? Paper given at the Fall Meetings of the American Geophysical Union, San Francisco.

11. Invited Lectures

"Numerical simulation of hillslope form", Department of Geology and Geophysics, University of California, Berkeley, 1982.

Groffman, P.E., M.K. Crawford and L.E. Band 1999. Riparian ecosystem function in urban watersheds. Paper given at Spring Meetings of the American Geophysical Union, Boston, June 1999.

L.E. Band 1999. Integrating hydroecological and socioeconomic processes in urbanizing watersheds. Paper given at Spring Meetings of the American Geophysical Union, Boston, June 1999.

N.L. Law and L.E. Band 1999. Spatial interactions of societal and biophysical attributes of urbanizing watersheds. Paper given at Spring Meetings of the American Geophysical Union, Boston, June 1999.

L.E. Band 1999. Urban flowpath alteration: Feedback to biogeochemical cycles. Paper given at the Meetings of the Ecological Society of America, Spokane, WA, August, 1999.

L.E. Band 1999. Hydrologic interactions and adjustments of soil-plant systems in catchments. Paper given at Fall Meetings of the American Geophysical Union, San Francisco, December 1999.

L.E. Band, C. Tague and P. Groffman 2000. Integrated modeling and monitoring of urbanizing watersheds. Paper given at the Annual Meeting of the American Association of Geographers, Pittsburgh, March 2000.

D. Tenenbaum and L.E. Band 2000. Developing the RHESSys/Arc-View Integrated Modeling Environment for use in Urban Watersheds. Paper given at the Annual Meeting of the American Association of Geographers, Pittsburgh, March 2000.

L.E. Band. Hydroecology of Urban Watersheds: The Baltimore LTER. Paper given at the Annual Meeting of the American Association of Geographers, Los Angeles, CA., March 2002.

N. Law, L.E. Band 2002. Lawns: One piece of the nutrient puzzle in urban watersheds. Paper given at the Spring Meetings of the American Geophysical Union, Washington, May 2002.

Shin, D. Bomchul Kim, and Lawrence E. Band, Impact of summer monsoon on a reservoir in East Asia, Proceedings of AWRA Water Resources Conference, Philadelphia, 2002.

Band, L E, Tague, C, Kenworthy, S, Law, N, 2002. Coupling water, carbon and nitrogen cycling with variable source area dynamics in forested and urban catchments. Paper given at the Spring Meetings of the American Geophysical Union, Washington, May 2002.

Band, L.E. 2004. Geomorphic controls of catchment scale linkages between hydrologic and nitrogen cycling: Paper given at Fall Meetings of the American Geophysical Union, San Francisco, December 2004.

Band, L.E. 2005. Integrated modeling of carbon, water and nutrient cycling at the watershed scale: Paper given at the Association of American Geographers Meetings, Denver, April 2005.

M J. Small, L. Band, and T. Hwang 2005. Using RHESSys eco-hydrological model to examine the affect of riparian buffer zone width and placement on

Creed, I.F., L.E. Band, I.K. Morrison, J.A. Nicolson, D.S. Jeffries, R.S. Semkin 1995. Topographic controls on the nitrogen content of discharge waters from catchments in the Turkey Lakes Watershed. American Geophysical Union. May 30-June 2, Baltimore, MD.

Creed, I.F., L.E. Band, J.A. Nicolson and N.W. Foster, 1995. Natural variation in biogeochemical fluxes from small catchments in an old-growth sugar maple forest. American Geophysical Union Meeting, December 11-15, San Francisco, CA.

L.E. Band 1995. Simulation of ecosystem processes at the watershed scale. Ecological Society of America Meeting, Jul 31-Aug 3, Snowbird, Utah.

Creed, I.F. and L.E. Band 1995. Topographic controls of nitrogen discharge from forested catchments. Ecological Society of America Meeting, Jul 31- Aug 3, Snowbird, Utah.

Creed, I.F. and L.E. Band 1996. Predicting nutrient flows from land to lakes: Topography is the key. Canadian Society of Limnology Meeting. Jan 4-6, Montreal, Quebec.

L.E. Band and I.F. Creed 1996. Effect of spatial organization of runoff-generating areas on water and nutrient fluxes in headwater catchments. AGU Fall Meetings, December 1996, San Francisco, CA.

Bonney, L., C.G. Trick, I.F. Creed and L.E. Band 1996. Spatial variability of dissolved organic carbon in soils of a forested catchment. Canadian Society of Limnology Meeting, Jan 4-6, Montreal, Quebec.

Fernandes, R.A., X. Wang and L.E. Band 1997. Scaling evapotranspiration in boreal ecosystems: The effect of uncertainties in remotely sensed parameters. AGU Spring Meeting, May 1997, Baltimore, MD.

Wang, X., R. Fernandes and L.E. Band 1997. Hydro-ecological simulation of boreal ecosystems: Scaling up from local to regional extent. AGU Spring Meeting, May 1997, Baltimore, MD.

Creed, I.F. and L.E. Band 1997. Export of Nitrate-N from catchments in a temperate forest: Role of organized versus disorganized N source areas. AGU Fall Meeting, San Francisco, CA.

Fernandes, R. and L.E. Band 1997. Estimating surface moisture status in Boreal peatlands using top of canopy mid-infrared reflectance. AGU Fall Meetings, San Francisco, CA.

Band, L.E. 1998. Linking hydroecological and socioeconomic form and process in a dynamic patch model for an urbanizing gradient in Baltimore. Ecological Society of America Annual Meeting, August 1998, Baltimore, MD.

Tague, C.L. and L.E. Band 1998. Using a composite index of landscape drainage in scaling distributed hydro-ecological modeling applications. AGU Spring Meetings, Boston, MA.

Tague, C.L. and L.E. Band 1998. Modeling the combined effects of forest roads and harvest on seasonal high and low flows in mountainous catchments. AGU Fall Meetings, San Francisco, CA.

A. Zhu and L.E. Band "Fuzzy inference of spatial soil properties," Paper given at 1992 meetings of the Ecological Society of American, Honolulu.

L.E. Band, R. Vertessey and R. Lammers "Distributed watershed processes using different terrain representation schemes." Paper given at the Third International Geomorphology Conference, August, 1993, Hamilton, Ontario.

J. Baron, L.E. Band, S.W. Running, D.W. Cline 1993. The effects of snow distribution on the hydrologic simulation of a high elevation Rocky Mountain watershed using Regional HydroEcological Simulation System, RHESys. Invited paper given at the Fall Meetings of the American Geophysical Union, EOS, v.74, no.43, p.237.

Band, L.E., R. Nemani, A. Perara 1994. Multiple scale simulations of forest water and carbon flux in Ontario. Poster given at the Fall Meetings of the American Geophysical Union, EOS, v.75, no.44, p.216.

R.B. Lammers, L.E. Band, C. Tague 1994. Scale effects of hydro-ecological simulations over variable landscape. Poster given at the Fall Meetings of the American Geophysical Union, EOS, v.75, no.44, p.218.

R.L. Walko, R.A. Pielke, L.E. Band, R. Lammers, C. Tague, J. Baron, T. Kittel 1994. Coupled ecosystem models for simulating the transport of groundwater. Invited paper given at the Fall Meetings of the American Geophysical Union, EOS, v.74, no.44, p.227.

L.E. Band 1994. A spatial framework for the parameterization and diagnosis of distributed simulation of watershed processes. Invited paper given at the Spring Meetings of the American Geophysical Union.

Lammers, R.B. and L.E. Band (1994) The Effects of Scale on a Regional Hydro-Ecological Model over Mountainous Terrain. Paper presented at the Association of American Geographers Annual Meeting, San Francisco, March 30th, 1994.

Band, L.E., R.B. Lammers and C. Tague (1994) Scaling Water and Carbon Budgets to Regional Extents: Simulation Approach. Paper presented at the scaling workshop in Swansea, Wales, April, 1994.

D.S Mackay and L.E. Band 1994. Extraction and representation of watershed structure including lakes and wetlands from digital terrain and remote sensing information. Invited paper given at the Spring Meetings of the American Geophysical Union.

Lammers, R.B., L.E. Band, R.G. Kremer and J.S. Baron (1995) Scaling Behaviour of Variables in a Hydro-Ecological Model over Heterogeneous Topography Paper presented at the American Geophysical Union Spring Meeting, Baltimore. May 31, 1995.

Band, L.E., R.B. Lammers and A. Perera (1995) Extrapolation of Simulated Forest Productivity and Hydrology over the Province of Ontario. Paper presented at the 7th International Conference on Geomatics June 14, 1995, Ottawa, Ontario.

Band, L.E., F. Csillag and I.F. Creed 1995. Application of RHESys to a northern hardwood experimental watershed. Hubbard Brook Ecosystem Study: Annual Cooperators Meeting, July 6-7, West Thornton, NH.

October 27-30, 2003. U.S. Department of Agriculture, Agricultural Research Service.

10. Papers Presented at Professional Meetings

L.E. Band "Steady and unsteady hillslope profiles", Proceedings of the Pacific Coast Geographers, Annual Meetings, Reno, 1980.

L.E. Band "Time-independence of hillslope forms", Proceedings of the American Association of Geographers, Annual Meetings, Los Angeles, 1981.

L.E. Band and V.B. Robinson, "On the orderedness of the cis-trans link problem in stream links", Poster Session at the AAAS Meetings in N.Y.C., 1984.

L.E. Band "Dynamics of stream junctions", Paper given at the Detroit Meetings of the American Association of Geographers, 1985.

W. Renwick and L.E. Band, "The concept of equilibrium in geomorphic systems", Paper given at the First International Geomorphology Meetings, University of Manchester, Manchester, England, 1985.

L.E. Band "Simulation of lateral stream migration", Paper given at the Minneapolis Meetings of the American Association of Geographers, 1986.

L.E. Band and E.F. Wood, "Computer graphics for distributed hydrologic modeling", Transactions, American Geophysical Union, vol. 67, no. 16, 1986, p. 278.

E.F. Wood, M. Sivapalan, L.E. Band, "The GUH: Is it an appropriate large-scale model? Transactions, American Geophysical Union, v.68, no.44, 1987, p. 1276.

L.E. Band "Distributed hydrologic simulation of variable source area at the watershed scale," Paper given at the Portland Meetings of the American Association of Geographers, 1987.

L.E. Band "Optimal partition of watersheds for hydrologic simulation," Paper given at the Phoenix Meetings of the American Association of Geographers, 1988.

L.E. Band "Digital terrain analysis for drainage basin structure and simulation," Paper given at the Spring Meetings of the American Geophysical Union, 1988.

L.E. Band "Distributed simulation of watershed ecosystem processes," Paper given at the Toronto Meetings of the American Association of Geographers, 1990.

L.E. Band "Distributed simulation of watershed carbon and water budgets," Paper given at the IGBP-BAHC meetings, Canberra, Australia, December, 1991.

L.E. Band "Effect of land surface representation on surface carbon and water budgets," Paper given at the Spring Meetings of the American Geophysical Union, 1992.

15. Baron, J., R. Pielke, B. Partion, L. Band, S. Running, 1994. Dynamic land surface/atmospheric parameterization at different spatial scales in the Colorado Rocky Mountains. pp.34-36 in: P.H. Gleick, A. Rango and K. Cooley, eds. Proceedings of a workshop on the use of hydrological models evaluating the impacts of climate change in snowmelt water supply basins. Santa Fe, NM, April 1993, Pacific Institute for Studies in Development, Environment and Security. Oakland, CA 94612.
16. Fernandes, R.A, J.R. Miller and L.E. Band, 1996 "Comparison of Linear Least Squares Unmixing Methods and Gaussian Maximum Likelihood Classification." Proceedings 25th IEEE Geosci. Rem. Sens. Meeting, Lincoln, Nebraska, p.420-422.
17. Fernandes, R.A., H.P. White, D.R. Peddle, J.R. Miller and L.E. Band 1996. The reflectance of *Pleurozium schreberi* as a function of water status and its implications on understory reflectance variations for BOREAS sites. Proceedings 25th IEEE Geosci. Rem. Sens. Meeting, Lincoln, Nebraska, p.212-214.
18. J.S. Baron, D.S. Ojima, M.D. Hartman, T.G.F. Kittle, R.B. Lammers, L.E. Band and R.A. Pielke 1996. The influence of spatial patterns of landcover and use on hydrological and ecosystem dynamics at the mountain plains interface in the Central United States. P.50-53 in Proceedings of the IGBP/BAHC-LUCC Joint inter-core projects symposium on interactions between the hydrological cycle and land use/cover. Kyoto, Japan.
19. Watson, F.G.R., Vertessy, R.A., & Band, L.E. (1996) Distributed parameterization of a large scale water balance model for an Australian forested region. HydroGIS 96: Application of Geographic Information Systems in Hydrology and Water Resources Management (Proc. of the Vienna Conf. April 1996), IAHS Publication No 235, pp 157-166.
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21. J.S. Baron, D.S. Ojima, M.D. Hartman, T.G.F. Kittle, R.B. Lammers, L.E. Band and R.A. Pielke 1997. The influence of land cover and temperature change on hydrological and ecosystem dynamics in the South Platte River Basin. Proceedings of the American Water Resources Association Meetings: Water resources education, training and practice: Opportunities for the next century, p.279-286.
22. Chen, J. M., J. Cihlar, L. Band, R. Desjardins, W. Gao, S. Goward, Z. Li, A. Royer, 1997. VEGETATION/SPOT for Northern Applications: Preliminary Results. Proceedings of 19th Canadian Symposium on Remote Sensing. CDROM (6 pages). Ottawa.
23. L.E. Band 1998. Ecosystem processes at the watershed scale: Scaling from stand to region. P.40-46 in Elements of Change, ed. S.J. Hassol and J. Katzenberger, Aspen Global Change Institute.
24. L.E. Band, M. Moss, F. Ogden 2003. The CUAHSI plan for a network of hydrologic observatories. P. 19-23 in, Renard, Kenneth G., McElroy, Stephen A., Gburek, William J., Canfield, H. Evan and Scott, Russell L., eds. 2003. First Interagency Conference on Research in the Watersheds,

3. L.E. Band and V.B. Robinson, "Information-theoretic analysis of the cis- trans link problem in stream networks", Modeling and Simulation, Proceedings of the Pittsburgh Conference, vol. 15, 1984.
4. (with H.L. McKim et al), "Potential applications of SPOT data for sediment pattern detection in Chesapeake Bay", Proceedings of the First Annual SPOT Symposium, Scottsdale, Arizona, 1984.
5. L.E. Band "Development of a distributed-components database for hydrologic simulation", Modeling and Simulation, Proceedings of the Sixteenth Pittsburgh Symposium on Modeling and Simulation, vol. 16, part 4, 1985, pp. 325-330.
6. L.E. Band "Digital elevation models and hydrologic information systems", in Advanced Technology for Monitoring and Processing Global Environmental Information, Proceedings of the International Conference of the Remote Sensing Society and the Center for Earth Resources Management. London, England, 1985, pp. 201-207.
7. L.E. Band, H.L. McKim, C. Merry, "Syntactic pattern recognition of pollutant plumes", Proceedings of the Fifth Army Corps of Engineers Remote Sensing Conference, Ann Arbor, Michigan, 1985, p.137-148.
8. L.E. Band and V.B. Robinson, "Automated construction of a hydrologic information system from digital elevation data", forthcoming in Proceedings of the Workshop on Geographical Information Systems for Environmental Protection, Environmental Research Center, University of Nevada, Las Vegas, 1986, p.99-112.
9. L.E. Band "Analysis and representation of drainage basin structure with digital elevation data", in Proceedings of the Second International Conference on Spatial Data Handling, Seattle, Washington, 1986, pp. 437-450.
10. L.E. Band, R.R. Nemani, S. Running, J. Coughlan, D. Peterson, J. Dungan, "Spatial modelling of forest watershed processes", Proceedings of ISPRS Midterm Symposium on Global Monitoring, 1990, Victoria, British Columbia, p.293-302.
11. S.W. Running, J.C. Coughlan, D.L. Peterson, L.E. Band, "Mapping regional forest evapotranspiration and photosynthesis by coupling satellite data with ecosystem simulation," IGARSS 90, 1990, p.265-268.
12. L.E. Band, L.Y. Fu, "Development of a GIS to aid in spatial modeling and management of soil erosion on the Loess Plateau," Proceedings of the Second International Workshop on Geographical Information Systems, Beijing, 1990, p.548.
13. D.S. Mackay, V.B. Robinson, L.E. Band, "An object-oriented system for the organization and representation of terrain knowledge for forested ecosystems. GIS/LIS91, Atlanta, Georgia, 1991.
14. L.E. Band, L.Y. Fu, "Structure and operation of SEMGIS: Soil erosion management geographic information system," Proceedings of the International Conference on Application of Geographical Information Systems to Soil Erosion Management, Taiyuan, 1992, p.31-42.

c. Technical Reports

1. L.E. Band, 1993. "Development of a preliminary landscape ecological model for the management of mixedwood forests in central Ontario," Ontario Forest Research Institute Technical Report, Forest Fragmentation and Biodiversity Project, Rept. no.7, 19p.
2. L.E. Band, 1994. "Development of a landscape ecological model for management of Ontario forests: Phase 2 - Extension over an east/west gradient through the province," Ontario Forest Research Institute Technical Report, Forest Fragmentation and Biodiversity Project, Rept. no.17, 40p.
3. Chen, J. M. J. Cihlar, L. Band, R. Desjardins, W. Gao, S. Goward, Z. Li, A. Royer, 1996. VEGETATION/SPOT for Northern Applications: First Progress Report to International VEGETATION Users Committee, Toulouse, France. 27 pages.
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5. L.E. Band, F. Csillag, A.J. Perera, J. Baker, 1999 "Deriving an eco-regional framework for Ontario" Ontario Forest Research Institute Technical Report, Forest Fragmentation and Biodiversity Project, Forest Research Report No. 149, 30p.
6. Chen, J. M. J. Cihlar, L. Band, R. Desjardins, W. Gao, S. Goward, Z. Li, A. Royer, 1998. VEGETATION/SPOT for Northern Applications: Final Pre-launch Report to International VEGETATION Users Committee, Toulouse, France. 38 pages.
7. L. Band, F. Ogden J. Butler, D. Goodrich, R. Hooper, D. Kane, B. Lyons, D. McKnight, N. Miller, M. Williams, K. Potter, B. Scanlon, R. Pielke, K. Reckhow, 2002. Hydrologic Observatories. CUAHSI Technical Report Number 4, August 2002, Washington D.C.
(http://www.cuahsi.org/publications/cuahsi_tech_rpt_4.pdf)
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8. Non-Refereed Publications

1. L.E. Band "On the development of characteristic slope profiles", in Modeling and Simulation, Proceedings of the Pittsburgh Conference, vol. 15, 1984, pp. 13-17.
2. L.E. Band "Extraction of topographic networks from digital elevation models", Proceedings of the XVI International Symposium of Remote Sensing of Environment, 1984.

4. R.R. Nemani, S.W. Running, L.E. Band, D.L. Peterson, "Regional hydroecological simulation system: An illustration of the integration of ecosystem models in a GIS", Chapter 28, p.296-304 in M.F. Goodchild, B.O. Parks, L.T. Steyaert (ed.), *Environmental Modeling with GIS*, Oxford University Press, 1993.
5. D.S. Mackay, V.B. Robinson and L.E. Band, "On a knowledge-based approach to the management of geographic information systems for simulation of forested ecosystems," in W.K. Michener, J. Brunt (ed.), *Environmental Information Management and Analysis*, p.511-534, Taylor and Francis, 1994.
6. R.B. Lammers Band, L.E. Band C. Tague 1997. Scaling water and carbon budgets to regional extents: Simulation approach. P.295-317 in, SEB Seminar Series --- Scaling Up, P. Van Gardingen, ed., Cambridge University Press, Cambridge.
7. Mackay, D.S. and L.E. Band (1997). Forest ecosystem processes at the watershed scale: dynamic coupling of distributed hydrology and canopy growth. In Beven, K.J. (Ed.). *Distributed Hydrological Modelling: Applications of the TOPMODEL Concept*, Wiley, Chichester, 85-104.
8. L.E. Band 1999. Spatial Hydrography and Landforms. Chapter 37 (p.527-542) in *GIS: Management Issues and Applications*, ed. P. Longley, M. Goodchild, D. Maguire and D. Rhind, John Wiley & Sons.
9. D. Baldwin, J. Desloges and L.E. Band 2000. Physical Geography of Ontario. Ch.3 (p.12-29) in *Ecology of a Managed Terrestrial Landscape: Patterns and Processes of Forests in Ontario*, ed. A.H. Perera, D.L. Euler, I.D. Thompson, University of British Columbia Press, in press.
10. L.E. Band 2000. Forest ecosystem productivity in Ontario. Ch.9 (p.163-178) in *Ecology of a Managed Terrestrial Landscape: Patterns and Processes of Forests in Ontario*, ed. A.H. Perera, D.L. Euler, I.D. Thompson, University of British Columbia Press.
11. L.E. Band and C. Tague 2005. Feedbacks and Coupling between Water, Carbon and Nutrient Cycling at the Hillslope Scale. Ch. 4.10, in Axel Bronstert, Jesus Carrera, Pavel Kabat, Sabine Lütke-meier (Eds), *Coupled Models for the Hydrological Cycle - Integrating Atmosphere, Biosphere, and Pedosphere*. Springer-Verlag, 2005.
12. Band, L.E., M. Cadenasso, S. Grimmond, M. Grove, S.T. Pickett, 2005. Heterogeneity in Urban Ecosystems: Pattern and Process. Ch.13 in, Lovett, G.M., C.G. Jones, M.G. Turner, and K.C. Weathers, editors. *Ecosystem Function in Heterogeneous Landscapes*. Springer-Verlag, NY.
13. Tague, C.L., L.E. Band and J. Franklin, 2006. Terrestrial Ecosystems. In, *Encyclopedia of Hydrological Sciences*, John Wiley & Sons, Chichester.
14. Pouyat, R.V., D.E. Pataki, K.B. Belt, P.M. Groffman, J. Hom, and L.E. Band. 2007. Effects of urban land-use change on biogeochemical cycles. In pages 45-58, Canadell, J.G., D.E. Pataki, and L.F. Pitelka (eds.) *Terrestrial Ecosystems in a Changing World*. The IGBP Series, Springer-Verlag, Berlin-Heidelberg-New York.

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55. D.E. Tenenbaum, L.E. Band, C.L. Tague, S. Kenworthy, 2005. Analysis of soil moisture patterns in forested and suburban catchments using high resolution photogrammetric and LIDAR digital elevation datasets. *Hydrological Processes*, 20, 219-240.

56. D.E. Tenenbaum, M.L. Cadenasso, L.E. Band and S.T.A. Pickett, 2006. Using Transects to Sample Digital Orthophotography of Urbanizing Catchments to Provide Landscape Position Descriptions. *GIScience & Remote Sensing*, 2006, 43, No. 4, p. 1-29.

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b. Books and/or Chapters in Books

1. L.E. Band, "Simulation of hillslope development and the magnitude and frequency of overland flow erosion", in M.J. Woldenberg (ed.), *Models in Geomorphology*, p.191-211. George Allen and Unwin, 1985.

2. L.E. Band, "Extraction of channel networks and topographic parameters from digital elevation data." Chapter 2, p.13-42 in M.J. Kirkby · K. Beven (ed.), *Channel Network Hydrology*, John Wiley, 1993.

3. I.D. Moore, A.K. Turner, J.P. Wilson, S.K. Jenson, L.E. Band, "GIS and land surface-subsurface modeling," Chapter 19, p.196-230 in M.F. Goodchild, B.O. Parks, L.T. Steyaert (ed.), *Environmental Modeling with GIS*, Oxford University Press, 1993.

38. T.X. Zhu, L.E. Band, R.A. Vertessy 1999. Continuous modelling of intermittent stormflows on a semi-arid agricultural catchment. *Journal of Hydrology*, v.226, p.11-29.
39. S.E. Brun and L.E. Band 2000. Simulating runoff behavior in an urbanizing watershed. *Computers, Environment and Urban Systems*, v.24, p.5-22.
40. Walko, R.L., L.E. Band, J. Baron, T.G.F. Kittel, R. Lammers, T.J. Lee, R.A. Pielke Sr., C. Taylor, C. Tague, C.J. Treback, P.L. Vidale 2000. Coupled atmosphere-biophysics-hydrology models for environmental modeling. *Journal Applied Meteorology*, v39, p.931-944.
41. J.S. Baron, M.D. Hartman, L.E. Band and R.B. Lammers 2000. Sensitivity of a high-elevation Rocky Mountain watershed to altered climate and CO₂. *Water Resources Research*, v.36, p.89-100.
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44. C.L. Tague and L.E. Band, 2001. Simulating the impacts of road construction and forest harvesting on hydrologic response. *Earth Surface Processes and Landforms*, v26, p.135-151.
45. C.L. Tague and L.E. Band, 2001. Evaluating explicit and implicit routing for watershed, hydroecological models of forest hydrology at the small catchment scale. *Hydrological Processes*, v.15, p.1415-1439.
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26. I.F. Creed, L.E. Band, N.W. Foster, I.K. Morrison, J.A. Nicolson, R.S. Semkin and D.S. Jeffries, 1996. Regulation of nitrate-N release from temperate forests: A test of the N flushing hypothesis. *Water Resources Research*, v.32, p.3337-3354.
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28. Zhu, A. and L.E. Band 1996. Inference of soil properties under fuzzy logic. *Ecological Modelling*, v.90, p.123-145.
30. D.S. Mackay and L.E. Band 1997. Forest ecosystem processes at the watershed scale: Dynamic coupling of distributed hydrology and canopy growth. *Hydrological Processes*, v.11, p.1197-1217.
31. A. Zhu, L.E. Band, R. Vertessy and B. Dutton, 1997. Soil property derivation using a soil land inference model (SoLIM). *Soil Science Society America Journal*, v.61(2), p.523-533.
32. Price, A.G., K.Dunham, T.Carleton, L.Band 1997. Variability of water fluxes through the black spruce (*Picea mariana*) canopy and feather moss (*Pleurozium schreberi*) carpet in the boreal forest of Northern Manitoba. *Jour. Hydrology*, v.196, p.310-333.
33. Mackay, D.S. and L.E. Band 1998. Topographic partitioning of watersheds with lakes and other flat areas on digital elevation models. *Water Resources Research*, v.34(4), p.897-901.
34. Creed, I.C. and L.E. Band 1998. Exploring functional similarity in the export of nitrate-N from forested catchments: A mechanistic modeling approach. *Water Resources Research*, v.34(11), p.3079-3093.
35. Creed, I.C. and L.E. Band 1998. Export of nitrogen from catchments within a temperate forest: Evidence for a unifying mechanism regulated by variable source area dynamics. *Water Resources Research*, v.34(11), p.3105-3120.
36. J.S. Baron, M.D. Hartman, T.G.F. Kittel, L.E. Band, D.S. Ojima, R.B. Lammers, 1998. Effects of land cover, water redistribution and temperature on ecosystem processes in the South Platte Basin. *Ecological Applications*, v.8, p.1037-1051.
37. Hartman, M., R.B. Lammers, J. Baron, D. Cline, L. Band, C.Tague 1999. Simulations of snow distribution and hydrology in a mountain basin. *Water Resources Research*, v.35, p.1587-1604.

10. L.E. Band, "Automating topographic and ecounit extraction from mountainous, forested area," *Artificial Intelligence in Natural Resources*, 1989, v.3, p.1-11.
11. L.E. Band, "Dynamic soil catenas and hillslope evolution," *Catena*, 1990, Suppl. 17, p.167-176.
12. R.L. Lammers and L.E. Band, "Automating object description of drainage basin", *Computers in Geoscience*, 1990, v.16, n.6, p.787-810.
13. L.E. Band, "Distributed parameterization of complex terrain," *Surveys in Geophysics*, 1991, v.12, p.249-270.
14. L.E. Band, D.L. Peterson, S.W. Running, J.C. Coughlan, R. Lammers, J.Dungan and R.R. Nemani, "Ecosystem processes at the watershed level: Basis for distributed simulation," *Ecological Modeling*, 1991, v.56, p.171-196.
15. Mackay, D.S., V.B. Robinson and L.E. Band. Classification of higher order topographic objects on digital terrain data. *Computers, Environment and Urban Systems*, 1992, v.16, p.473-496.
16. D.S. Mackay, V.B. Robinson and L.E. Band, 1992. An integrated knowledge-based system for managing spatiotemporal ecological simulations. *AI Applications*, v.7(1), p.29-36.
17. L.E. Band, P. Patterson, R.R. Nemani and S.W. Running, "Forest ecosystem processes at the watershed scale: 2. Adding hillslope hydrology." *Agricultural and Forest Meteorology*, 1993, v.63, p.93-126.
18. Scuderi, L.A., C. Barker-Schaff, K.U. Orth and L.E. Band, 1993. Alpine treeline growth variability: simulation using an ecosystem process model. *Arctic and Alpine Research*, v.25, p.175-182.
19. Band, L.E. 1993. Effect of land surface representation on forest water and carbon budgets. *Journal of Hydrology*, v.150, p.749-772.
20. Nemani, R.R., L. Pierce, L.E. Band, S.W. Running, 1993. Forest ecosystem processes at the watershed scale: Sensitivity to remotely sensed leaf area index observations. *International Journal of Remote Sensing*, v.14, p.2519-2534.
21. Zhu, A. and L.E. Band 1994. Knowledge-based approach to data integration for soil mapping, *Canadian Journal of Remote Sensing*, v.20, p.408-417.
22. Band, L.E., R. Vertessey and R.B. Lammers, 1995. The effect of different terrain representation schemes and resolution on simulated watershed processes. *Zeitschrift fur Geomorphologie, Suppl-Bd. 101*, p.187-199.
23. Band, L.E. and I.D. Moore, 1995. Scale: Landscape attributes and GIS. *Hydrological Processes*, v.9, p.401-422.

- 2004-2011 "Human settlements as ecosystems: Metropolitan Baltimore from 1790-2100," NSF Long Term Biology, LTER Network, one of 13 principal investigators, \$7,200,000.
- 2005-2008 "Biocomplexity/Coupled Natural Human Systems: Feedbacks Between Complex Ecological and Social Models: Urban Landscape Structure, Nitrogen Flux, Vegetation Management, and Adoption of Design Scenarios," co-principal investigator, \$1,499,000 (UNC portion \$150,000).
- 2005-2006 "Vulnerability of North Carolina watersheds to drought," principal investigator, \$67,000, North Carolina Urban Water Consortium.
- 2006-2007 "Landslide hazard modeling in Western North Carolina," principal investigator, \$74,999, USFS.

C. SCHOLARLY AND PROFESSIONAL WORK

7. Refereed Publications

a. Journal Articles

1. L.E. Band, O.E. Elfes, J.T. Hayes, L.O. Mearns, P.A. O'Rourke, B.J. Stevenson, W.H. Terjung and P.E. Todhunter, 1981), "Application of a photosynthesis model to an agricultural region of varied climates: California", Agricultural Meteorology, vol. 24, 1981, pp. 201-217.
2. L.E. Band, "Field parameterization of an empirical sheetwash equation", Catena, vol. 12, no. 4, 1985, pp. 282-290.
3. L.E. Band, "Topographic partition of watersheds with digital elevation models", Water Resources Research, vol. 22, no. 1, 1986, pp. 15-24.
4. L.E. Band, "Lateral migration of stream channels", Catena, Supplement 10, 1987, p. 99-110.
5. L.E. Band and E.F. Wood, "Strategies for large scale, distributed hydrologic modeling", Applied Mathematics and Computation, 1988, v.27, p.23- 37.
6. E.F. Wood, M. Sivapalan, K. Beven and L.E. Band, "Effects of spatial variability and scale with implications to hydrologic modeling," Journal of Hydrology, 1988, v.102, p.29-47.
7. L.E. Band, "A terrain based, watershed information system", Hydrological Processes, 1989, v.3, p.151-162.
8. L.E. Band, "Scale dependence of hillslope complexity," Geographical Analysis, 1989, v.21, p.279-293.
9. S.W. Running, R.R. Nemani, D.L. Peterson, L.E. Band, D.F. Potts and L.L. Pierce, "Mapping regional forest evapotranspiration and photosynthesis by coupling satellite data with ecosystems simulation," Ecology, 1989, v.70, p.1090-1101.

- 1990 -1992 "Development of ILIS (Intelligent Landscape Integration System) part of SHERI (System for Hierarchical Experts for Resource Inventories Program", Canada Centre for Remote Sensing, principal investigator, (\$84,455)
- 1993 -1996 "Boreal Ecosystem-Atmosphere Study: Boreal Forest Carbon and Water Budget Simulation: Scaling from Local to Regional Extent", Collaborative Research Program, NSERC, co-principal investigator, (\$120,000)
- 1993 -1994 "Dynamic land surface/atmospheric parameterization at different spatial scales for the South Platte river drainage," principal investigator, NOAA subcontract through Colorado State University, (US\$24,100/yr.)
- 1994 -1997 "Multi-scale evaluation of RHESys over different biomes," principal investigator, NASA subcontract through University of Montana, (US\$84,000/yr.)
- 1995-1998 "An integrated watershed impact assessment system," principal investigator, NSERC (\$55,600)
- 1997-2000 "Impact of social systems on ecology and hydrology in urban-rural watersheds: Integration for restoration", NSF/EPA Water and Watersheds Program, one of 8 principal investigators, (\$999,932)
- 1997-2004 "Human settlements as ecosystems: Metropolitan Baltimore from 1790-2100," NSF Long Term Biology, LTER Network, one of 11 principal investigators, \$4,900,000.
- 2000-2002 "Modeling land surface nitrogen transformation and transport within Piedmont and Coastal Plain watersheds," principal investigator, UCAR, \$96,000.
- 2001-2003 "Hydroecological organization and dynamics in urbanizing watersheds," principal investigator, NSF, \$276,307.
- 2001-2002 "Drought impact assessment system," principal investigator, Water Resources Research Institute of North Carolina, \$40,000.
- 2002-2005 "Forested and Agricultural Watershed Nitrogen Attenuation (FAWNA)", co-principal investigator, EPA, \$555,000.
- 2002-2007 "Hydroecology of the Ohio Hills," principal investigator, US Forest Service, \$119,000
- 2003 "Drought vulnerability in the Catawba River Basin," principal investigator, Duke Energy Foundation, \$100,000.
- 2003-2004 "Sources, transport and fate of sediment and nutrients from a redeveloping watershed: Hydrology of the central UNC Campus," principal investigator, Water Resources Research Institute of North Carolina, \$20,000.

Member:

Association of American Geographers
American Geophysical Union

B. ACADEMIC HISTORY

6. Research Awards

1984 - 1985 NASA-AMES University Consortium, "Algorithm development for efficient interrogation of a distributed land data pilot information system", collaborator, (\$14,985)

1984 - 1985 PSC-CUNY Research Award Program, "Extraction of topographic networks from digital elevation models", principal investigator, (\$4,800)

1985 NASA University Applications Program, "Center for Expertise in Spatial Modeling and its Application to Remote Sensing", co-principal investigator, (\$69,980)

1986 NASA-Ames Research Center, "Automated construction of a spatial framework to integrate remotely sensed data with a distributed, process-based ecosystem model", principal investigator, (\$15,575)

1986 NYC Department of Parks, "Hydrology of Alley Pond Park", principal investigator, (\$4,800)

1984 - 1987 Cold Regions Research and Engineering Laboratory, United States Army Corps of Engineers, "Potential application of SPOT high-resolution digital imagery for military and civil works objectives of the Army Corps of Engineers", principal investigator, (\$74,051)

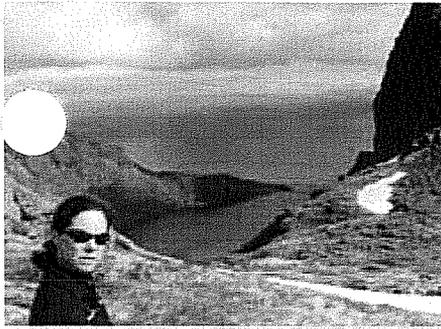
1986 - 1987 "Estimation of topographic parameters for distributed hydrologic models from digital elevation data", Professional Staff Congress of the City University of New York, principal investigator, (\$6,000)

1986 - 1989 "Extrapolation of process models of evapotranspiration and net primary production of coniferous forests to large spatial scales", NASA, principal investigator, (\$131,571)

1988 - 1989 "Construction of a watershed information system," University of Toronto, Connaught Research Award, (\$10,000)

1990 - 1993 "Inference of soil properties using a GIS for hydroecological modelling", NSERC, principal investigator, (\$20,000/yr.)

1990 -1994 "Extrapolation of Ecosystem Processes to Regional Scales: Development of RESSys (Regional Ecosystem Simulation System), principal investigator, NASA subcontract through University of Montana, (US\$279,206)



Dr. Margaret Lang
Professor
Environmental Resources Engineering
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Spring 2007 Schedule
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Publications and Presentations
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Spring 2007 Schedule

Dr. Margaret Lang

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8:00-9:00	ENGR 333	E333 Lab	ENGR 333	#####	ENGR 333
9:00-10:00	#####	E333 Lab	#####	#####	#####
10:00-11:00	Office Hours	E333 Lab	Office Hours	Chairs Mtg	*****
11:00-12:00	Office Hours	#####	Office Hours	Chairs Mtg	*****
12:00-1:00	#####	Dept Mtg	#####	#####	#####
1:00-2:00	*****	#####	#####	Office Hours	#####
2:00-3:00	*****	#####	#####	Office Hours	#####
3:00-4:00	*****	#####	#####	#####	#####
4:00-5:00	*****	#####	*****	#####	#####

- indicates unavailable times

***** - hours available for appointments

If you can not attend scheduled office hours, contact me by phone or email for an appointment.

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Spring 2007 Courses

Course links provide the course lecture and lab schedule and reading assignments. Complete course syllabi and all supplemental materials are available on the course Moodle site.

- [Engineering 333: Fluid Mechanics](#)

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Brief Resume

Education

- B.S., Civil Engineering, University of Illinois at Urbana-Champaign, 1983.
- M.S. Environmental Engineering and Science, Stanford University, 1984.
- PhD, Environmental Engineering and Science, Stanford University, 1995.

Work Experience

- 2000-present Associate Professor, Environmental Resources Engineering, Humboldt State University, California
- 1995-'00 Assistant Professor, Environmental Resources Engineering, Humboldt State University, California
- 1989-'94 Research Assistant, Department of Civil Engineering, Stanford University, California
- 1985-'89 Engineer, Tetra Tech, Inc. Environmental Systems, Lafayette, California
- 1984-'85 Research and Development Engineer, Austgen-Biojet, Inc., San Francisco, California
- 1983-'84 Research Assistant, Department of Civil Engineering, Stanford University, California
- 1983 Engineer, Alaska Environmental Control Services, Anchorage, Alaska
- 1979-'83 Laboratory technician, University of Illinois at Urbana-Champaign

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Publications and Presentations

- "Monitoring Fish Passage at Culverts on Coastal Streams." Lang, M. M., M. Love, and B. Trush. American Fisheries Society-California/Nevada Division Annual Meeting. March 30 - April 1, 2000. Ventura, California.

- **"Incorporating Laboratory Experience and Service Learning into an Introductory Water Quality Course."** Lang, M. M. American Society for Engineering Education National Conference. Seattle, Washington, June 28 - July 1, 1998.
- **"Model Simulations in Support of Field Scale Design and Operation for Cometabolic Degradation."** Lang, M. M., Roberts, P. V., and Semprini, L. *Ground Water*. Vol 35(4). p.565. July/Aug 1997
- **"In situ bioremediation using a recirculation well."** Lang M. M., Semprini, L. and Roberts, P. V. (1993) *Proceedings of the ASCE Hydraulics Division Symposium*. San Francisco, California. July 25-30, 1993.
- **"Design and treatability study of in situ bioremediation of chlorinated aliphatics by methanotrophs at St. Joseph, Michigan."** Semprini, L., McCarty, P. L., Dolan, M., Lang, M., MacDonald, T., Bae, J., Kitanidis, P. In *Bioremediation of Hazardous Wastes*. (1992) EPA/600/R-92/126. 43-50.
- **"In-Situ Biotransformation of Carbon Tetrachloride Under Anoxic Conditions".** Semprini, L., Hopkins, G. D., Janssen, D. B., Lang, M. M., Roberts, P. V., and McCarty, P. L. U. S. Environmental Protection Agency technical report, US EPA Kerr Environmental Research Laboratory. (1991) EPA/2-90/060.
- **"Biotransformation of Carbon Tetrachloride in batch-exchanged laboratory soil columns under anoxic conditions."** Lang, M. M., Semprini, L., Roberts, P. V., McCarty, P. L., and Janssen, D. B.. *EOS, Transactions of the American Geophysical Union* 71(43), p. 1323, 1990. Presented at the Fall 1990 AGU Meeting, San Francisco, California.
- **"MYGRT Code Version 2.0: An IBM Code for Simulating Migration of Organic and Inorganic Chemicals in Groundwater".** Summers, K. V., Gherini, S. A., Lang, M. M., Unga, M. J., and Wilkinson, K. J. Electric Power Research Institute technical report. (1989) EPRI EN-6531.
- **"Future Effects of Long Term Sulfur Deposition on Surface Water Chemistry.** Church, M. R. et al. (1989) US EPA. Office of Research and Development, Corvallis, Oregon. Technical Report Nos. (1989) EPA/600/3-89/061a, 061b, 061c, 061d.

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Research Interests

- fish passage (Check out the [FishXing](#) page.)
- surface and groundwater hydrology
- contaminant transport
- water quality

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Some useful HSU sites:

- [ERE Homepage](#)

- [HSU Homepage](#)
- [Library/Media Services](#)
- [Computing and Telecommunications Services](#)
- [HUG Help Desk](#)

This page is maintained by Margaret Lang.
Last Updated: *August 16, 2005*

From: Margaret Lang <mm11@humboldt.edu>
To: Gerald Bowes <gbowes@waterboards.ca.gov>
Date: 8/28/07 11:36:36 AM
Subject: Re: Conflict of Interest Disclosure Form Related to Proposed Instream Flows Policy

Dr. Bowes-

Thank you for the update, I was wondering about the proposal. I have not recently updated my CV but as you noticed it is time to. I will send an updated CV version soon.

As for significant additions to the information I provided in May, I have added two externally funded projects:

- 1) Updating Part VII of the California Dept. of Fish and Game's California Salmonid Restoration Manual to reflect current practice and design methods for culvert retrofits to improve fish passage. This work is being funded through a grant issued by the Pacific Coast Fish, Wildlife and Wetlands Association.
- 2) Evaluating the impacts of daily peaking flows on fish habitat and populations in the Green River below Flaming Gorge Dam. This work is for the Western Area Power Administration and is funded through Argonne National Laboratories. My responsibility is field measurements and hydraulic modeling.

I am on sabbatical this academic year and have plans to spend several 4-5 week periods with different research groups in the US and elsewhere. However, I should remain in email contact.

Best regards,
Margaret

--

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DEPARTMENT OF AGRICULTURAL ECONOMICS

Faculty Member Information

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Richard T. Woodward

Associate Professor

PhD (Agricultural and Applied Economics), University of Wisconsin-Madison

MA (Agricultural and Applied Economics), University of Wisconsin-Madison

BA (Economics), Middlebury College

Research Interests:

Environmental and Resource Economics

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About Dr. Woodward:

Dr. Richard T. Woodward is an Associate Professor in the Department of Agricultural Economics at Texas A&M University. His research is in the general area of environmental and resource economics. Recent research projects have focused on the use of transferable permits to address fisheries problems and problems of choice under uncertainty.

Selected Publications:

Woodward, Richard T., Yong-Suhk Wui and Wade L. Griffin. "Living with the Curse of the Commons: Closed-Loop Optimization in Large-scale Fisheries Simulation Model." *American Journal of Agricultural Economics* 87(February 2005):48-60.

Penson, J.B., O. Capps, C.P. Rosson and R.T. Woodward. *Introduction to Agricultural Economics* (2nd edition). Prentice Hall. 2006.

Woodward, Richard. "Do Americans Desire Homogeneity? Evidence from Names from the Census." *Economics Bulletin* 4(August 31, 2005):1-6.

Woodward, R.T. and W.L. Griffin. "A Theoretical and Empirical Analysis of Size
Recreational Fisheries." *Marine Resource Economics*. 18(2003):235-45.

Woodward, R.T., A.M. Wicks and R.A. Kaiser. "The Structure and Practice of Water-
Markets" *Journal of the American Water Resources Association*. 38(August 2002):9

Woodward, R.T. and Y.S. Wui. "The Economic Value of Wetland Services: a meta-
Economics 37(May 2001):257-270.

Woodward, R.T. "Sustainability as Intergenerational Fairness: Efficiency, Uncertainty
Methods." *American Journal of Agricultural Economics* 82(August 2000): 581-593.

Woodward, R.T., and R.C. Bishop. "How to Decide When Experts Disagree: Uncertain
Rules in Environmental Policy." *Land Economics* 73(November 1997):492-507.

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[State of Texas](#) | [Statewide Search](#) | [Compact with Texans](#) | [Privacy Statement](#) | [Local We](#)

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CURRICULUM VITAE
(updated: November 2006)

I. Personal Information

Name : Richard T. Woodward
Current Position: Associate Professor
Department of Agricultural Economics
Texas A&M University
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Telephone: 979-845-5864 Fax: 979-845-4261
Email: r-woodward@tamu.edu

Date of Appointment: August 1, 1997

II. Education

Ph.D. University of Wisconsin, Madison, WI
Major: Agricultural and Applied Economics
Degree Date: May 1997
Thesis Title: "Sustainability, Efficiency and Economic Analysis: A Macroeconomic Framework with Microeconomic Implications"

M.A. University of Wisconsin, Madison, WI
Major: Agricultural Economics
Degree Date: May 1994

B.A. Middlebury College, Middlebury, VT
Major: Economics
Degree Date: April 1984
Thesis Title: "The Economics of Philanthropic Behavior"
Honors: Cum Laude and Highest Honors in Department of Economics.

III. Experience

9/2003 - Present Associate Professor, Department of Agricultural Economics, Texas A&M University (appt: 50% teaching, 50% research)
Responsibilities include teaching and research in applied economics with emphasis in the area of natural resource and environmental economics.

8/1997 - 8/2003 Assistant Professor, Department of Agricultural Economics, Texas A&M University (appt: 50% teaching, 50% research)

9/1992 - 5/1997 Research Assistant to Drs. Richard C. Bishop and Jay Coggins, Department of Agricultural and Applied Economics, University of Wisconsin, Madison

Major projects included the analysis of the economics of sustainability for the U.S. Environmental Protection Agency and the sustainability of the Lake Superior fisheries for University of Wisconsin Sea Grant.

- 5/1994 - 8/1994 Consultant for the World Resources Institute
Reviewed natural resource and environmental accounting studies as part of an effort to develop indicators of sustainable development.
- 12/1989 - 7/1991 Research Associate for the World Resources Institute/Tropical Science Center, San José, Costa Rica
In-country representative of the World Resources Institute on a one-year natural resource accounting study valuing forestry, fishery, soils and mangroves. Also conducted research on the relationship between internal human migration and natural resource degradation.
- 9/1988 - 12/1989 World Resources Institute, Washington D.C.
Assisted in analysis of issues including forestry policy, ozone depletion and natural resource accounting.
- 1/1985 - 5/1987 Peace Corps volunteer, Costa Rica
Worked in the establishment and management of student cooperatives in rural high schools.

IV. Publications and Professional Output

A. Books

Penson, John B. Jr., Oral Capps, Jr., C. Parr Rosson III and Richard T. Woodward. *Introduction to Agricultural Economics*, fourth edition. Upper Saddle River, New Jersey: Prentice Hall, 2006.

B. Refereed Journal Articles

Following the convention of *Agricultural Economics*, the seniority of authorship is indicated by the order of the names unless otherwise indicated.

(* *invited papers*)

*Woodward, Richard T. and Richard C Bishop. "Efficiency, Sustainability and Global Warming." *Ecological Economics* 14(August 1995):101-11.

*Woodward, Richard T. and Richard C Bishop. "How to Decide When Experts Disagree: Uncertainty-Based Choice Rules in Environmental Policy." *Land Economics* 73(November 1997):492-507. Also presented at the annual meeting of the American Agricultural Economics Association, San Antonio, TX, July 28-31, 1996 with abstract published in the *American Journal of Agricultural Economics* 78(December 1996):1406.

- Woodward, Richard T. and Richard C. Bishop. "Optimal-Sustainable Management of Multi-Species Fisheries: Lessons from a Predator-Prey Model." *Natural Resource Modeling* 12(Fall 1999):355-377.
- Shively, Gerald, Richard Woodward and Denise Stanley. "Strategy and Etiquette for Graduate Students Entering the Academic Job Market." *Review of Agricultural Economics* 21(Fall 1999):513-26.
- Woodward, Richard T. "Sustainability as Intergenerational Fairness: Efficiency, Uncertainty and Numerical Methods." *American Journal of Agricultural Economics* 82(August 2000): 581-593.
- Woodward, Richard T., Wade Griffin, Dhazn Gillig and Teofilo Ozuna. "The Welfare Impacts of Unanticipated Trip Limitations in Travel Cost Models." *Land Economics* 77(August 2001): 327-338.
- Woodward, Richard T. and Yong-Suhk Wui. "The Economic Value of Wetland Services: a Meta-analysis." *Ecological Economics* 37(May 2001):257-270.
- Woodward, Richard T. and Ronald A. Kaiser. "Market Structures for U.S. Water Quality Trading." *Review of Agricultural Economics* 24(Fall/Winter 2002):366-383.
- Woodward, Richard T., Aaron-Marie Wicks and Ronald A. Kaiser. "The Structure and Practice of Water-Quality Trading Markets." *Journal of the American Water Resources Association* 38(August 2002):967-979.
- Woodward, Richard T. and Richard C. Bishop. "Sector-level Decisions in a Sustainability-constrained Economy." *Land Economics* 79(February 2003):1-14.
- Woodward, Richard T. "Lessons About Effluent Trading from a Single Trade." *Review of Agricultural Economics* 25(Spring/Summer 2003):235-245.
- Gillig, Dhazn, Richard T. Woodward Teofilo Ozuna, Jr. and Wade L. Griffin. "Joint Estimation of Revealed and Stated Preference Data: An Application to Recreational Red Snapper Valuation." *Agricultural and Resource Economics Review* 32(October 2003):209-221.
- Woodward, Richard T. and Wade L. Griffin. "A Theoretical and Empirical Analysis of Size and Bag Limits in Recreational Fisheries." *Marine Resource Economics* 18(2003):235-45.
- Wipon Aiew, Rodolfo M. Nayga, Jr. and Richard T. Woodward. "The Treatment of Income Variable in Willingness to Pay Studies." *Applied Economics Letters* 11(July 2004):581-585.
- Woodward, Richard T., Yong-Suhk Wui and Wade L. Griffin. "Living with the Curse of Dimensionality: Closed-Loop Optimization in Large-scale Fisheries Simulation Model." *American Journal of Agricultural Economics* 87(February 2005):48-60.
- Nayga, Jr., Rodolfo M., Richard Woodward and Wipon Aiew. "Experiments on the Divergence between Willingness to Pay and Willingness to Accept: The Issue Revisited," *Economics Bulletin* 17 (January. 2005):1-5.

*Woodward, Richard T. "Overview: Markets for the Environment." *Choices* 20(First Quarter 2005):49-51.

Woodward, Richard. "Do Americans Desire Homogeneity? Evidence from Names from 1900–2000." *Economics Bulletin* 4(August 31, 2005):1-6

Nayga, Rodolfo M., Jr., Richard T. Woodward and Wipon Aiew. "Willingness to Pay for Reduced Risk of Food-borne Illness: A Non-Hypothetical Artefactual Field Experiment." *Canadian Journal of Agricultural Economics* (forthcoming)

Kim, Hwa Nyeon, Richard T. Woodward, W. Douglass Shaw and Wade L. Griffin "Distributional Consequences of Fees in a Discrete Choice Model of Recreation Demand with Incomplete Data: An Application to Mode-Specific Fishing," *Land Economics*, . (Forthcoming, November 2007)

C. Journal Articles (not refereed)

Woodward, Richard T. "Market-Based Solutions to Environmental Problems: Discussion." *Journal of Agricultural and Applied Economics* 32(August 2000):259-266.

D. Book Chapters

Bishop, Richard C. and Richard T. Woodward. "Valuation of Environmental Amenities Under Certainty." *Handbook of Environmental Economics*, Daniel W. Bromley, ed. pp. 543-567. Oxford: Blackwell Publishers, 1995.

Bishop, Richard C. and Woodward, Richard T. "Sustainability, Economy and Environment." *Environmental Economics: Theory, Application, and Policy*. Chapman, D., pp. 373-394. Reading Mass.: Addison Wesley, 1999. (one of four invited guest chapters in a twenty-chapter text book)

Woodward, R.T., Griffin, W.L. and Wui, Y.-S. *DPSIM Modelling: Dynamic Optimization in Large Scale Simulation Models*. Chapter 14 pages 275-294, in Scarpa R. and Alberini, A. (eds.). *Applications of simulation methods in environmental and resource economics*. Springer Publisher, Dordrecht, The Netherlands, 2005.

E. World Resources Institute Reports

Hammond, Allen L. Albert Adriane, Eric Rodenburg, Dirk Bryant and Richard Woodward. "Environmental Indicators: A Systematic Approach to Measuring and Reporting on Environmental Policy Performance in Context of Sustainable Development." 1995. World Resources Institute, Washington, DC.

Cruz, Maria Concepcion, Carrie A. Meyer, Robert Repetto and Richard Woodward. "Population Growth, Poverty, and Environmental Stress: Frontier Migration in the Philippines and Costa Rica." 1992. World Resources Institute, Washington, DC.

Tropical Science Center and the World Resources Institute. "Accounts Overdue: Natural Resource Depreciation in Costa Rica." 1991. World Resources Institute, Washington, DC. (Woodward was the principal WRI representative on this research project and oversaw the research and writing of the final report in both English and Spanish).

F. Contracts and Grants

1. External

Funded

"Effluent Trading: A Policy Review for Texas," Texas Natural Resources Conservation Commission carried out in conjunction with the Center for Public Leadership Studies, George Bush School of Government and Public Service, Arnold Vedlitz (PI), Mark A. Fossett, Ronald A. Kaiser, Marty D. Matlock, and Richard T. Woodward (Co-Investigators), 5/1999 - 11/1999, \$121,069.

"An Integrated Economic Analysis of Alternative Bycatch, Commercial, and Recreational Policies for the Recovery of Gulf of Mexico Red Snapper," NOAA Marine Fisheries Initiative (MARFIN), Richard T. Woodward and Wade L. Griffin (Co-PIs) and Teofilo Ozuna (collaborating), 1/1999 - 12/2001, \$147,649 (competitive).

"Bioeconomic Analysis of the Red Snapper Rebuilding Plan and Transferable Rights Policies in the Gulf of Mexico." Wade L. Griffin and Richard T. Woodward, Co-PI's. 1/2003 - 12/2005. \$183,464. National Marine Fisheries service under the Marine Fisheries Initiative Program (Marfin). (competitive)

"Cost and Effectiveness of Sequential License Buyback Programs in the Gulf of Mexico's Shrimp Fishery." Richard T. Woodward and Wade L. Griffin, Co-PI's. 2/2004 - 1/2006. \$185,416. National Marine Fisheries service under the Marine Fisheries Initiative Program (Marfin). (competitive)

"Trading for Land-Based Environmental Services: Overlapping Opportunities and Challenges in Greenhouse Gasses and Water Quality." PI: Richard T. Woodward, Co-PI: Bruce McCarl. 2/2005 - 2/2007. \$25,779. U.S.E.P.A. Environmental and Resource Economics Workshops (competitive).

"Perceived Risks and Willingness to Pay for Hurricane Protection" PI: W. Douglass Shaw, Co-PI's Samuel D. Brody (Landscape Architecture and Urban Planning), William Neilson (Economics), Mary Riddel (University of Nevada, Las Vegas) and Richard T. Woodward. 2/2006 - 1/2007. \$96,638. National Science Foundation, Small Grants for Exploratory Research Proposal (competitive).

"Economic Analysis of Red Snapper Bycatch Reduction Management Alternatives for Directed and Non-directed Fisheries." Wade L. Griffin (PI) and Richard T. Woodward (Co-PI). \$190,158. 9/2006 - 8/2008. National Marine Fisheries Service under the Marine Fisheries Initiative Program (Marfin). (competitive)

Pending

Six-month Award from Fulbright Scholar Program. Richard T. Woodward. 1/2008-6/2008. Submitted to Fulbright Scholar Program.

“Efficiency and Design Lessons from the Great Miami River Watershed Water Quality Credit Trading Program.” Richard T. Woodward and W. Douglas Shaw. 9/2007 - 2/2009. \$185,796. Submitted to USEPA/Market Mechanisms and Incentives.

V. Service**A. Budgeted Time**

None.

B. Professional and Honorary Societies and Associations

- Member American Agricultural Economics Association
- Member American Economics Association
- Member Association of Environmental and Resource Economists
- Founding Member of TeXas Economists

C. Service to Profession*Editorial Responsibilities*

Guest Editor, *Choices*, series of articles on “Markets for the Environment.” First Quarter, 2005, Volume 20(1).

Associate Editor, *Marine Resources Economics*, April 2005- present.

Review Panels

Peer reviewer of proposals for USEPA’s 2001 STAR program, “Socioeconomic Causes & Consequences of Future Environmental Changes.” November 1, 2001, Washington D.C.

Peer reviewer of proposals for USEPA’s 2001 STAR program, “Market Mechanisms and Incentives” November 7-8, 2002, Washington D.C.

Ad hoc Journal Reviewer and Referee

1. *American Journal of Agricultural Economics*
2. *Aquaculture Economics Review*
3. *Ecological Economics*
4. *Environmental and Resource Economics*
5. *Forest Science*
6. Illinois-Indiana Sea Grant College Program Proposal
7. *Journal of Agricultural and Resource Economics*
8. *Journal of Environmental Economics and Management*
9. *Journal of Environmental Management*

10. *Journal of Soil and Water Conservation*
11. *Journal of the American Water Resources Association*
12. *Land Economics*
13. Maryland Sea Grant
14. Michigan Great Lakes Protection Fund, Michigan Department of Environmental Quality
15. *Natural Resource Modeling*
16. *Resource & Energy Economics*
17. *Society and Natural Resources*
18. United States- Israel Binational Agricultural Research and Development Fund
19. *Water Resources Research*

Professional Conferences

1. Selected paper reviewer for the 2004 Meetings of the Western Agricultural Economics Association.
2. Selected paper reviewer for the 2002 Meetings of the American Agricultural Economics Association.
3. Discussant, Invited Paper session on "Market-Based Solutions to Environmental Problems." Annual Meetings of the Southern Agricultural Economics Association, February 2000.
4. Discussant, Selected Paper Session on "Efficiency of Environmental Policy." Annual Meetings of the American Agricultural Economics Association, Salt Lake City, UT, August 1998.
5. Chair, Selected Paper session on "Climate Change Policies." First World Congress of Environmental and Resource Economists, June 1998.

D. Service to University

1. Participated in the symposium, "Private Land Stewardship and Conservation: Partnerships for Collaborative," jointly sponsored by the George Bush School's Center for Public Leadership Studies and the College of Agriculture and Life Sciences' Institute of Renewable Natural Resources, April 2-4, 2000.
2. Provided substantial editorial and substantive input into an article for *Texas Water Resources*, "What is the Future of Rice Irrigation?" by Ric Jensen. January, 2001.
3. Search committee member for The Caroline and William N. Lehrer Distinguished Chair, Water Engineering Biological and Agricultural Engineering Department 2003-2005.
4. Member of the Association of Former Students' Distinguished Achievement Award Selection Committee, College Level Teaching Awards, May, 2004.

E. Service to Department*Committee Assignments*

1. Seminar Committee: Spring 1998 - Summer 2000. Chair: Fall 1998 - Summer 2000
 - Organized 25 seminars over four semesters
 - Oversaw the development of a successful \$2,500 Professional and Career Development Grant for Spring 2000 seminar series (five of eleven proposals were funded).
 - Initiated the Department's Alumni Seminar Series, inviting Dr. Stan Johnson and Mr. Fredrick McClure in the first two years.
2. Awards Committee, research awards subcommittee: Fall 1998 – present. Chair 2000 - present.
3. Graduate Advisory Committee. Fall 2000 - present (chair 2005 - present)
4. Ph.D. Qualifier Examination Committees: May 2001 - present
5. Chair of the Department's Resources Workgroup Fall 2001 - present.
6. Faculty Advisory Committee Fall 2001 - 2003.
7. Organizer of Resources brownbag seminars 2003 - present (6 seminars from April - December 2003)
8. Resource and Environmental Economics Prelim Committee: 2003 - present.
9. Chair of search committee, Assistant/Associate Professor in Water Resources Policy and Economics, 2003 - 2004.

Other activities in service to the department

1. Ad-hoc committee of the Graduate Advisory committee to supervise a re-examination of students who failed the qualifying exam. June 2000.
2. Visited with potential graduate students and faculty from the University of Costa Rica and CATIE to promote the Department's graduate curriculum in Costa Rica, July 21, 2000.
3. With Dr. Bruce McCarl, organized a biweekly seminar series on the economics of climate change attended by Department faculty and graduate students. 2002 - 2003.

ROBERT A. GEARHEART

EDUCATION

- Ph.D. Civil Engineering University of Oklahoma, 1969,
Professor George Reid
- M.S. Civil Engineering- University of Oklahoma, 1965,
Professor George Reid
- B.A. Biology and Mathematics- North Texas State University, 1964,
Dr. J. K. G. Silvey

Professional Engineer – Registered Civil Engineer State of California –C 38158

EMPLOYMENT EXPERIENCE

- 1975- Emeritus Professor, Department of Environmental Resources Engineering, Humboldt State University, Arcata, California, undergraduate engineering instruction water quality, low cost water and wastewater treatment, water and wastewater treatment, hazardous waste management. Co-Director of International Development Technology Program Graduate Program. Research wetland treatment systems for domestic effluent and water reclamation, non-point source pollution marsh treatment system, use of wetlands for denitrification and perchlorate reduction, role of wetland restoration and watershed management, use of conjunctive watershed/lake models to manage eutrophication, surf zone and ocean monitoring, solid and hazardous waste management, and environmental impact analysis. Advising graduate students, Engineering, Biology, Geology and International Development, Faculty Advisor for HSU's Chapter of Engineers Without Borders
- 1971-1975 -Associate Professor, Division of Environmental Engineering, Utah State University, undergraduate and graduate instruction, research, statewide extension program, water supply, water reclamation, wastewater treatment and solid waste management, spray irrigation of waste effluent.
- 1970-1971 -Engineer-Manager, Beaver Water District, Regional Water Supply System, Northwest Arkansas (one-half time). Design, operation, personnel and fiscal tasks associated with 10 MGD plant.
- 1968-1971 -Assistant Professor of Civil Engineering; University of Arkansas-Undergraduate and graduate courses in Sanitary Engineering-Research in eutrophication and water quality modeling, and biological treatment processes.

ORGANIZATIONS/AFFILIATIONS

- American Water Works Association-Life member
Water Environment Federation
International Water Association
Society of Wetland Scientists
Sierra Club
Audubon Society

RESEARCH AND CONSULTING EXPERIENCE

- 2007 Humboldt Bay Harbor and Recreation District, Community member on 5 years strategic master plan-water quality and harbor natural resources
- 2007 Worldbank, Wastewater Management Master Plan, Dhaka, Bangladesh, Mike 11 Model
- 2006 Guizhou Province, China, Feasibility Plan for Use of Constructed Wetland to Treat Refinery Waste and to Restore Wetland Habitat, Sino-US Prosper in Peace Association
- 2006 Conceptual Design of Wetland System to Treat Domestic and Agricultural Wastewater, Lake Qarun, Fayoum, Egypt, Montgomery Watson Harza Engineering
- 2005-Present Hatfield Science Team, USFWS-Klamath Falls, Oregon
- 2005 City of Cumberland, B.C., Design of Constructed Wetland to treat Domestic Wastewater
- 2004 City of Fort Bragg, California, Wetland Treatment Conceptual Plan for Redevelopment of the Georgia /Pacific Industrial Site
- 2003 Technical Review Team for Malibu Lagoon Restoration Plan-Heal the Bay/California Coastal Conservancy
- 2003-Present Review Bureau of Reclamation Flow Studies for the Klamath River-Yurok Tribal Council

2003 Wetland restoration design Caledonia Marsh, Klamath Falls Oregon, USFWS

2004 Wetland design, agricultural runoff, K and K Ranch, Klamath Falls, Oregon USFWS

2004 Treatment Wetland Design for Collins Products, Klamath Falls, Oregon

2004-Present Public Utility Commission, City and County of San Francisco, Technical Review Team, Water Reuse and reclamation, technical selection process for wastewater treatment systems

2001 –2003 Fish and Wildlife Service-Klamath Falls Oregon-Wetland design-agricultural runoff/habitat

2002 Santa Clara Valley Water District – Water reuse wetland application.

2002 DeForest Park Wetland Design – Long Beach, CA Coastal Conservancy.

2001-Present Colorado Lagoon – Long Beach, CA. Non-point source pond/wetland treatment system.

2001 Port Authority, City/County San Francisco, CA. Non-point source Master Plan

2001 Status of the Science White Paper, Klamath River Basin, Hader Foundation, New York, NY

2001 American Red Cross, Honduras, Design of Wetland Treatment systems for two re-settlement communities- Ciudad Espana and Colonia Cruz Roja

2000 **USAID/Harza Engineering**, El-Fayoum, Egypt, Middle Egypt Water and Sanitation Master Plan, Lake Quran, Maadi, Egypt. Low cost wastewater treatment (wetlands), Lake water quality, waste load allocation, and stream modeling.

2000 City of Petaluma, California – Value Engineering- Review of Facility Plan, specific input dealing with low cost treatment and reuse options, Carollo engineering, walnut Creek, Ca.

2000 City/County of Phoenix, Az., Review Design and operation and maintenance requirements for the full scale effluent polishing, habitat enhancement, water reclamation wetland system.

1999-present Use of Constructed Wetlands to treat perchlorate contaminated groundwater (denitrification/perchlorate reduction), Apache Nitrogen Products, Benson, Arizona, Super Fund Project, Hargis and Associates, Tucson, Arizona.

1999-Present National Recreational Area – Page, Arizona. Wahweap wetland treatment reuse system in conjunction with Parson’s Engineering, Phoenix, Arizona.

1999-Present City of Willits, California, Wetland Treatment -Effluent Disposal and Treatment Upgrade Plan, Larry Moran, Water and Wastewater Supervisor.

1998-Present City of Willits, California, Effluent Management Plan and Pond-Wetland Treatment Design

1998 **USAID/World Bank** - Estuarine Restoration Use of Expert System to Choose Appropriate Wastewater Technologies - Recife, Brazil.

1999-Present Collins Wood Forest Products, Klamath Falls, Oregon, Bureau of Reclamation/Fish and Wildlife Service Wetland Restoration Initiative, Travis Huntley, CWP

1998-Present Warm Beach Christian Camp – Stanwood, Washington. Wetland treatment with effluent reuse, in conjunction with H. R. Esvelt Engineering, Bainbridge Island, Washington.

1997-Present **World Bank** - working with an International consulting firm combined with local engineering firms on a World Bank wastewater treatment project in Recife, Brazil. This includes assessing the capability of natural systems, wetlands and mangrove swamps to treat wastewater for protection of natural systems.

1997-Present **Department of Justice**, Couer D’ Alene, Idaho - Expert Witness-US Department of Justice - analysis of restoration techniques and monitoring methods and expert analysis of water quality and watershed contaminant loading issues associated with mining -Super Fund Project

1997 West Valley Sanitation District, Coachella Valley, Ca. – Wetland Treatment design-ENARTEC Engineers, Bill Imus, San Diego, Ca.

1997 **USEPA**-Prepared the Draft Free Surface Constructed Wetland Design Manual, Cincinnati USEPA, Jim Kriessl.

1997 USEPA/ETI - City of Phoenix, 1997, Technology Prepare Draft Technology Assessment of Constructed Wetlands, Review and evaluation of constructed free surface constructed wetlands to treat domestic wastewater. Paul Kinshella, City/County of Phoenix Az. Water and Wastewater Division.

1997 Finalize the WAWTTAR decision support software for **USAID/EHP** for selecting appropriate wastewater/water reclamation technologies. Utilization of an expert system to compare wetland treatment system with conventional treatment systems. Craig Hafner Environmental Health Project, Arlington, Virginia.

1997 Technical Review Team, California State University San Luis Obispo Campus Center for

- Alternative and Innovative Water, Wastewater, Energy, and Solidwaste Management-Wetland Treatment Component.
- 1996-1997 **The Nature Conservancy of Oregon** - Project manager for developing a restoration plan for the Williamson River at Upper Klamath Lake, Oregon. Five thousand acres of diked and drained wetlands converted to riverine, riparian, and wetland values and functions, Mark Stern, TNC, Portland.
- 1996-Present **City and County of San Francisco, California Public Utility Commission Technical Review Committee** for Alternative Source Reduction, Source Control, Wastewater/CSO treatment, and Wastewater reuse options for watershed management masterplan.
- 1996 **Korea/KAWACO** - Consultant for Harza Engineering working with SunJin Engineers in designing a constructed wetland to treat non-point source pollution and untreated domestic wastewater, Dr. B.K. Lee, Harza Engineering, Chicago, Ill.
- 1996 -Arcata, California Design and construction of a free surface constructed wetland to treat animal waste from a 200 head dairy in Humboldt County.
- 1996 -Dinuba, California - **Odwalla Corporation** - 1996. Assist in the design of a closed loop water, wastewater, energy, and solid waste system for a juice company concerned with a wide range of environmental and community issues related to food processing industries. Includes a wetland treatment process of industrial wastewater.
- 1996 -Initiative to Combat Desertification, **World Bank** - Tunisia
Assist in the design and implementation of a workshop to evaluate wastewater treatment/reuse options in arid and semi-arid countries. Included use of constructed wetlands - Jordan, Egypt, Tunisia, Israel, and Palestinian National Authority.
- 1996 -**Palau Republic** - Winzler and Kelly Engineers and Engineering Science Parsons. Presented three seminars to local decision makers concerning the use of constructed wetlands to treat domestic wastewater. Prepared a basis for design report for the use of constructed wetlands for Karor, Palau to protect nearshore receiving water within the barrier reef.
- 1995 -**USAID/EHP Project**, Design-Gaza City- Evaluation of wastewater wetland for water reclamation.
- 1995 -Del Norte County, CA. Solidwaste Management Authority, Assessment of and Treatment Alternatives for a Landfill Leachate Hazardous Waste.
- 1995 -Anacortes, Washington, Constructed Wetland Treatment System, HDR Engineers, Seattle Washington.
- 1994 -**EPA Region 9/Bechtel Engineering**, Apache Powder Super Fund Site - Use of Constructed Wetlands to Treat Contaminated Groundwater. Dentrifying wetland system.
- 1994 -**Bureau of Reclamation** - Klamath Lake, Oregon - Use of Constructed Wetlands to Reduce Phosphorus Loading to Hyper Eutrophic Lake, Watershed Model, Reservoir Model, Pilot Projects.
- 1994 -**City of Phoenix, Arizona** - Technical Review Team for Use of Constructed Wetlands to Polish Activated Sludge Effluent for Discharge into the Tres Rios River for Supporting Fisheries and Wildlife.
- 1994 -Manila Community Service District, Humboldt County, California, Facility Plan and Basis for Design of a Pond/Wetland/Infiltration System.
- 1994 -Palo Cedros High School, Shasta County, California-Non-point Source Wetland System for 120 acre development.
- 1994 -**World Bank, PEC DAR** (Palestinian Economic Commission for Development of Reconstruction). Strategy for improving sanitation facilities and reusing effluent for Gaza and the West Bank.
- 1994 -**USAID's Environmental Health Project** (Arlington, Virginia/Low Cost Wastewater Treatment System for Rural Communities in Egypt.
- 1993 -Union Carbide, Seaport, Texas, Use of Free Surface Constructed Wetland to Remove Suspended Solids from Oxidation Pond Effluent - Polyester Plant.
- 1993 -City of Ashland, Oregon, Woodward-Clyde Consultants Wetland Treatment Alternative/Rapid Infiltration Alternative - Facility Plan Amendment.
- 1993 -City of Napa, California - Constructed Wetland Alternatives for Treating Oxidation Pond Effluent - Facility Plan Amendment.

- 1993 -City of Santa Rosa, California - Technical Review Team for EIR Supplement - Wetland Treatment/Habitat Alternative.
- 1993 -**USAID/Mideast Bureau of State Department**, Development of An Interactive Exper Computer Model To Select Appropriate Water and Wastewater Treatment System for Reuse in Developing Countries, Workshop July 25-Aug. 5, 1993 at Newport Beach, California for 17 representatives from Middle East countries.
- 1993 -American Canyon, California, Brown and Caldwell Engineering - Basis for Design for Free Surface Constructed Wetland.
- 1992-93 -**Tennessee Valley Administration/USAID/EPA** Feasibility Plan for Constructed Wetlands in Tata and Fertorakos, Hungary.
- 1992 -Lihi-Lani Recreation Community- Oxidation Pond/Wetlands Wastewater Treatment and Reclamation System, Engineering Concepts, Honolulu, HI.
- 1992 -Kingman, Arizona, Concept Plan for Wetland Treatment for Effluent Polishing - Nitrogen Removal - John Corolla Engineers, Phoenix, Arizona.
- 1992 -**Technical Advisory Panel "Everglades Protection Project** - Phosphorous Removal in Wetlands", Nolte and Associates, Sacramento, CA.
- 1992 -**State of Washington Attorney General**, expertise witness for the state on use of constructed wetland as a viable wastewater treatment alternative - City of Sequim, WA.
- 1992 -American Cyanamid - Niagara Falls, New York - Use of Constructed Wetland to Remove Ammonia Levels of An Industrial Waste Leachate.
- 1991-Present -**Bureau of Reclamation** - Eastern Municipal Water District, Hemet, California - Technical Review Team - Use of Constructed Wetlands In A Total Water Reuse System in Arid Areas.
- 1991-Present -Design, Construction and Study of a Constructed Wetlands Demonstration Project - Sacramento Regional Wastewater Treatment Plant - Nolte and Associates, Sacramento, CA.
- 1991 -City of Davis Wetlands Demonstration Project, Larry Walker and Associates, Davis, CA.
- 1990 -Mount Angel, Oregon, Wetland Treatment System, Westech Engineering, Salem, Oregon.
- 1990 -Eastern Municipal Water District, Hemet, California- Wetland Treatment /Water Reuse/Groundwater Recharge - Bureau of Reclamation Project.
- 1990 -**AAAS- Sub-Saharan Malaria Project-** Committee Member- Contribution Author - An Intersectional Approach to Malaria in Development in Africa.
- 1988 -**Consultant to Peace Corps-Programming Water Supply and Health/Sanitation Volunteer-Pre-service and in-service training courses** - Sierra Leone, Ghana, Nepal, Morocco, Mauritania, and Niger.
- 1980-Present -**Consultant to USAID through Water & Sanitation for Health Project (WASH I & WASH II)-** short term technical assistance training programs in area of rural water supply/sanitation-hygiene education for Indonesia, Belize, Sierra Leone, Kenya, Tanzania, Swaziland, Malawi and Ghana.

SEMINARS AND SHORT COURSES

- 2006 -Lorman Seminar Series., Constructed and Restored Wetlands:: The Future of California Water Quality, San Francisco, California
- 2006 -UAJBO-Oaxaca, Mexico, Constructed Wetland Short Course
- 1996-2004 -Annual Constructed Wetland Workshop, Humboldt State University,
Director and Lead Instructor for a 5 day lecture, laboratory, and fieldwork workshop for engineers, planners, and biologists. Use of Constructed Wetlands for Improved Water Quality-Planning and Design,
- 2001 -Wetland Short Course, Butte Montana, Montana AWWA-WEF Annual Conference
- 1998-1999 -Technology Transfer Workshop, EPA Region 4, Kansas City, Kansas Use of Constructed Wetland to Treat Domestic Effluent.
- 1998 -Constructed Wetland Workshop - Hungarian Ministry of the Environment, Budapest, Hungary, Oct. 11-20. Lead instructor.
- 1992 -Graduate Seminar, Environmental Engineering Department - UC Berkeley, Constructed Wetland - Design Consideration, March 1992.

- 1991 -EPA-Technology Transfer Conference- Denver, Colorado -Design, Construction, and Operations of Constructed Wetlands, Sept. 1991.
- 1991 -EPA-Technology Transfer Conference-Portland, Oregon, June Constructed Wetland Technology.
- 1990 -City of Paradise, California- Constructed Wetland Treatment Systems.
- 1990 -Graduate Seminar Presentation- Civil Engineering Dept., U.C. Davis on Arcata Wetland Treatment System- May 1990.
- 1989 -Wetland Treatment Systems, Anacortes, Washington.
- 1988 -Gearheart, R.A. and George Allen- Co-Director- National Workshop on Wetlands for Wastewater Treatment and Resource Enhancement. August 3-6, 1988. Humboldt State University, Arcata,.

SELECTED PUBLICATIONS AND REPORTS

- Gearheart, R.A., Use of Constructed to Manage Water Quality, Southwest Hydrology, January-March
- Gearheart, R. A. The Use of A Free Surface Constructed Wetland As An Alternative Process Treatment Train To Meet Unrestricted Water Reclamation Standards, *Water Science*, Vol. 40, pp. 375-382, 1999.
- Gearheart, R.A. Criteria for Design of Free Surface Constructed Wetlands Based Upon A Coupled Ecological and Water Quality Model. Presented at the 5th International Conference on Wetland Systems for Water Pollution Control. Vienna, Austria September 15-19, 1996.
- Gearheart, R.A. "Watershed and Lake Management Strategy For Improving Water Quality in Upper Klamath Lake, Oregon". The First Klamath Basin Ecosystem Research and Coordination Meeting, March 14-16, 1995. Sponsored by the Klamath Basin Ecosystem Restoration Office - OIT, Klamath Falls, Oregon.
- Gearheart, R.A., "Using Wetlands for Nitrogen Polishing. Proceedings on Nitrogen, Environment, and People- an International Conference, Everett, WA. 1995.
- Gearheart, R.A. "Watershed-Wetlands-Wastewater Management", Natural and Constructed Wetlands for Wastewater Treatment and Reuse - Experiences, Goals, and Limits, International Seminar, Centro Studi Provincia Perugia, Italy, 26-28 October, 1995.
- Gearheart, R.A., "Eight Years of Full-Scale Operations at a Free-Surface Wetland Treating Domestic Wastewater", 86th Annual American Society of Agronomy/Crop Science Society of America/Soil Science Society of America, Seattle, WA. - Nov. 13-18, 1994.
- Gearheart, R.A. "Use of Constructed Wetlands to Treat Domestic Wastewater - City of Arcata, California," *Water Science. Technology.* ,Vol. 26. No. 7-8 pp 1625-1637, 1992.
- Gearheart, R.A. "Phosphorus Removal in Constructed Wetlands", presented at the 66th WEF Annual Conference, Anaheim, California, October 3-7, 1993.
- Gearheart, R.A. et al., Metals Literature Review - Wetland Process, submitted to Union Sanitary District East Bay Dischargers Authority and East Bay Regional Park District, 128 pages. February 1992.
- Gearheart, R.A. et al., "Integrated Site Metals Data and Implications for Food Web Toxicity, Hayward Marsh, Union Sanitary District, East Bay Dischargers, and East Bay Regional Park District, 125 pages, February 1992.
- Gearheart, R.A. and George Waller, "An Overview of Potential Wetland Opportunities in the Malibu Creek Watershed", prepared for Marsh System Subcommittee, Malibu Regional Wastewater Systems Citizen Committee, August 1989.
- Gearheart, R.A., "Constructed Open Surface Wetlands: Water Quality Benefits and Wildlife Benefits, City of Arcata, California", International Conference on Constructed Wetlands for Water Quality Improvement. University of West Florida, Pensacola, Florida, October 1991. Proceedings in print.
- Gearheart, R.A., "Nitrogen Cycle in Constructed Wetlands", 1991 Annual WEF Conference, Washington, D.C. Manuscript in progress.
- Gearheart, R.A., Community Based Maintenance and Cost Recovery of Piped Rural Water Schemes- Malawi, WASH Report No. 309.
- Gearheart, R.A., "Criteria for Selection Low Cost Water and Wastewater Technology for Developing Country," Symposium on African Water Supply- Sponsored by Atlanta University/USAID, Atlanta, Georgia, May 6-9, 1987.
- Gearheart, R. A. and Brad Finney, "Utilization of Wetlands As A Reliable Low Cost Wastewater Treatment Process". Proceedings of the Aquatic Plants for Water Treatment and Resource Recovery Conference, Orlando, Florida, July 1986.

HONORS AND AWARDS

- 2002 Specially Recognized Alumnus Biology Department-North Texas University, Denton, Texas
- 1998 American Society of Civil Engineers Northcoast Section-Engineer of the Year
- 1989 -Scholar of the Year - Humboldt State University.
- 1988 -Boston Visions - 2nd Place Award for a solution to Boston Harbor's water quality problems - use of wetlands to treat point and non-point source pollution affording recreational opportunities in an urban setting - Boston Society of Architecture and Boston's Redevelopment Agency.
- 1986 -Meritorious Service Award - Humboldt State University
- 1987 -Ford Foundation Award - Part of the City of Arcata's Task Force (1978-1986). Resulting in the Arcata Marsh and Wildlife Sanctuary - Principal Engineer on the project. \$100,000 award.

(Supervisor: Dr Gordon Hartmant)

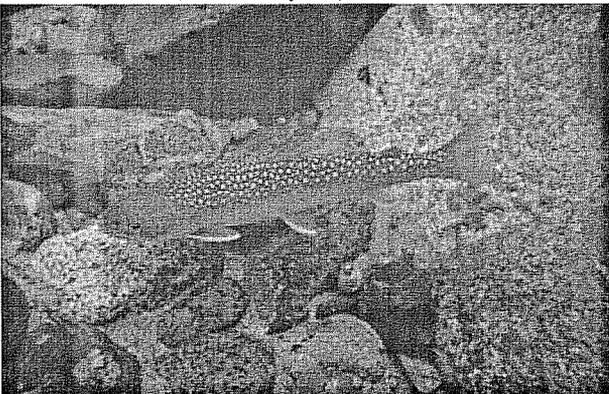
- 1979-84 Fishery Biologist, Habitat Evaluation Program, U.S. Fish and Wildlife Service, National Ecology Center, Fort Collins, Colorado
- 1978 Fishery Technician, LaGrande, OR
- 1976-78 Graduate Research Assistant, U of Arizona
- 1975 Fishery Technician, Juneau, AK
-

Courses : LINK TO COURSE WEBPAGES

- ***FALL***
 - **Introduction to Fish and Wildlife, FWL 201**
 - **Research Methods and the Scientific Process, BIOL 525**
 - ***SPRING***
 - **Principles of Fish and Wildlife Management, FWL 301, co-taught with Bob Garrott**
 - **Fish Habitat Management, FWL 513, Odd numbered years**
 - **Topics in Fish Ecology, BIOL 452, Even numbered years**
 - ***ON DEMAND***
 - **Undergraduate Internship, FWL 476**
 - ***SUMMER***
 - **Ecology of Trout Streams, BIOL 580, summer class part of MSU MS in Science Education major for high school science teachers, co-taught with Billie Kerans**
 - **Teaching Improvement Grant: "Enhancing Active Learning in the Natural Resource Sciences-A Seminar Series" Coordinators: T. McMahon, J. Wraith, and R. Garrott, 1998-2000**
-

Research

(Bitterroot bull trout, M.Jakober photo)



My interest is conducting applied research directly related to current questions in fisheries management as well as testing ecological principles on which fishery management is based.

Interest Areas:

stream salmonid ecology and management	whirling disease
conservation of native fishes	life history/otolith
microchemistry of salmonids	
winter ecology of salmonids	fish-forestry interactions
fish passage at road culverts	

Current/Recent Projects:

- **Thermal Requirements of Westslope Cutthroat Trout** (Wild Fish Habitat Initiative, Montana Water Center,
- **Factors Affecting the Relative Abundance of Migratory and Resident Life History Forms among Bull**

- Trout Populations** (AVISTA and US Fish and Wildlife Service)
- **Does Fire Favor Nonnative Fishes?** (USFS, Rocky Mountain Research Station, Mike Young, USFS Rocky Mountain Research Station, co-PI)
 - **Factors Limiting Recruitment of Wild Rainbow Trout in Hebgen Reservoir, MT** (PPL Montana and Montana FWP)
 - **Role of Culverts in Fragmenting Fish Populations within a Large Drainage Basin in Western Montana** (Montana Dept of Transportation, co-PI, Joel Cahoon MSU BioResources Engineering Dept)
 - **Interaction of Life History, Fish Size, and Infection Risk on Population-level Effects of Whirling Disease on Missouri River Rainbow Trout** (National Partnership on the Management of Wild and Native Cold Water Fisheries)
 - **Growth and Survival Temperature Criteria for Bull Trout** (National Council for Air and Stream Improvement)
 - **Susceptibility of Montana's Spring Creeks to Whirling Disease Infection** (Whirling Disease Foundation)
 - **Status of Sauger in Montana** (Montana Fish, Wildlife, and Parks)
 - **Microchemical Analysis of Otoliths to Determine Life-History Patterns in Interior Salmonids** (US Forest Service, Rocky Mountain Research Station)
 - **Origins of Nonnative Lake Trout in Yellowstone National Park using Otolith Microchemistry** (Yellowstone National Park; A. Munro PI)
 - **Spawning and Rearing Ecology of Madison River Rainbow Trout in Relation to Whirling Disease Infection Risk** (National Partnership on the Management of Wild and Native Cold Water Fisheries)

Selected Publications, Reports and Presentations

- McMahon, T.E., A.V. Zale, F.T. Barrows, J. Selong, and R. Danehy. Temperature and competition between bull trout and brook trout: a test of the elevation refuge hypothesis. Transactions of the American Fisheries Society, in revision.
- Bear, E.A., T.E. McMahon, and A.V. Zale. Comparative thermal requirements of westslope cutthroat trout and rainbow trout: implications to species interactions and development of thermal protection standards. Transactions of the American Fisheries Society, in press.
 - McMahon, T., and W.J. Matter. 2006. Linking habitat selection, emigration, and population dynamics of freshwater fishes: a synthesis of ideas and approaches. Invited presentation to International Symposium on Behaviour and Ecology of freshwater fish: Linking Ecology and Individual Behaviour, Danish Institute of Freshwater Fisheries Research, Silkeborg, Denmark. Aug 2004. Ecology of Freshwater Fish 15: 200-210. [PDF](#)
 - Zymonas, N.D., and T.E. McMahon. 2006. Effect of pelvic fin ray removal on survival and growth of bull trout. North American Journal of Fisheries Management 26:953-959.
 - McMahon, T.E. 2006. Review of NOAA-Fisheries Biological Opinion on Effects of Proposed Central Valley (CA) Project Changes on Listed Fish Species. NOAA Southwest Fisheries Center and Center for Independent Experts. (<http://swr.nmfs.noaa.gov/news/McMahon%20CALFED%20Salmon%20review%20report%20-%20January%2018,%202006.pdf>) [PDF](#)
 - Munro, A.R., T.E. McMahon, and J.R. Ruzzycki. 2006. Where did they come from? Natural chemical markers identify source and date of lake trout introduction in Yellowstone Lake. Yellowstone Science 14(2): 4-12. [PDF](#)
 - Jaeger, M.E., A.V. Zale, T. E. McMahon, and B.J. Schmitz. 2005. Seasonal movements, habitat use, aggregation, exploitation, and entrainment of sauger in the lower Yellowstone River: an empirical assessment of factors affecting population recovery. North American Journal of Fisheries Management 25:1550-1568. [PDF](#)
 - Watschke, D.A., and T.E. McMahon. 2005. A lightweight modification of the McNeil core substrate sampler. Journal of Freshwater Ecology 20:795-797. [PDF](#)
 - Munro, A.R., T.E. McMahon, and J.R. Ruzzycki. 2005. Natural chemical markers identify source and date of introduction of an exotic species: lake trout (*Salvelinus namaycush*) in Yellowstone Lake. Canadian Journal of Fisheries and Aquatic Sciences 62:79-87. [PDF](#)

- Hartman, G.F., and T.E. McMahon. 2004. Aspects of fish reproduction and some implications of forestry activities. Pages 143 to 168 IN T.G. Northcote and G.F. Hartman (eds.). *Fishes and Forestry- Worldwide Watershed Interactions and Management*. Blackwell Science.
- Rich, C.F. Jr., T.E. McMahon, B.E. Rieman, and W.L. Thompson. 2003. Local habitat, watershed, and biotic features associated with bull trout occurrence in Montana streams. *Transactions of the American Fisheries Society* 132:1053-1064. [PDF](#)
- Munro, A.R., T.E. McMahon, S.A. Leathe, and G. Liknes. 2003. Evaluation of batch marking small rainbow trout with coded wire tags. *North American Journal of Fisheries Management* 23:601-605. [PDF](#)
- Downing, D.C., T.E. McMahon, B.L. Kerans, and E.R. Vincent. 2002. Relation of spawning and rearing life history of rainbow trout and susceptibility to *Myxobolus cerebralis* infection in the Madison River, Montana. *Journal of Aquatic Animal Health* 14:191-203. [PDF](#)
- Nelson, M.L., T.E. McMahon, and R.F. Thurow. 2002. Decline of the migratory form in bull charr, *Salvelinus confluentus*, and implications for conservation. *Environmental Biology of Fishes* 64:321-332. [PDF](#)
- Selong, J.H., T.E. McMahon, A.V. Zale, and F.T. Barrows. 2001. Effect of temperature on growth and survival of bull trout, with application of an improved method for determining thermal tolerance in fishes. *Transactions of the American Fisheries Society* 130:1026-1037. [PDF](#)
- McMahon, T.E., and W.M. Gardner. 2001. Status of sauger in Montana. *Intermountain Journal of Sciences* 7:1-21.
- Jakober, M.J., T.E. McMahon, and R.F. Thurow. 2000. Diel habitat partitioning by bull charr and cutthroat trout during fall and winter in Rocky Mountain streams. *Environmental Biology of Fishes* 59:79-89.
- Jakober, M.J., T.E. McMahon, and R.F. Thurow. 1998. Role of stream ice on fall and winter movements and habitat use by bull trout and cutthroat trout in Montana headwater streams. *Transactions of the American Fisheries Society* 127:223-235. [PDF](#)
- McMahon, T.E., A.V. Zale, and D.J. Orth. 1996. Aquatic Habitat Measurements. Pages 83-120 IN B. Murphy and D. Willis, (eds.). *Fisheries Techniques*, 2nd edition. American Fisheries Society.
- McMahon, T.E., and D.H. Bennett. 1996. Walleye and northern pike: boost or bane to Northwest fisheries. *Fisheries* 21(8):6-13. [PDF](#)
- Dalbey, S.R., T.E. McMahon, and W. Fredenberg. 1996. Effects of electrofishing pulse shape and electrofishing-induced spinal injury on long-term growth and survival of wild rainbow trout. *North American Journal of Fisheries Management* 16:560-569. (Received best paper award for 1996, NAJFM)
- Magee, J.P., T.E. McMahon, and R.F. Thurow. 1996. Spatial variation in spawning habitat of cutthroat trout in a sediment-rich stream basin. *Transactions of the American Fisheries Society* 125:768-779.
- Endicott, C.L., and T.E. McMahon. 1996. Development of a TMDL (total maximum daily load) to reduce nonpoint source sediment pollution in Deep Creek, Montana. Montana Dept. of Environmental Quality Rept. 103 pp.
- McMahon, T.E., S.R. Dalbey, S.C. Ireland, J. Magee, and P. Byorth. 1996. Field evaluation of visible implant tag retention by brook trout, cutthroat trout, rainbow trout, and Arctic grayling. *North American Journal of Fisheries Management* 16:921-925.
- McMahon, T.E., and S.H. Holanov. 1995. Foraging success of largemouth bass *Micropterus salmoides* at different light intensities: implications for time and depth of feeding. *Journal of Fish Biology* 46: 759-767. [PDF](#)
- McMahon, T. 1992. Potential impacts of the introduction of walleye to the fishery of Canyon Ferry Reservoir and surrounding waters. Montana Fish, Wildlife and Parks Rept.
- McMahon, T.E., and L.B. Holtby. 1992. Behaviour, habitat use, and movements of coho salmon smolts (*Oncorhynchus kisutch*) during seaward migration. *Canadian Journal of Fisheries and Aquatic Sciences* 49: 1478-1485.
- McMahon, T.E., and D.S. deCalesta. 1990. Effects of fire on fish and wildlife. Pages 233-250 IN J. Walstad (ed.). *Natural and Prescribed Fire in Pacific Northwest Forests*. Oregon State University Press, Corvallis.
- McMahon, T.E., and G.F. Hartman. 1989. Influence of cover complexity and current velocity on winter habitat use by juvenile coho salmon (*Oncorhynchus kisutch*). *Canadian Journal of Fisheries and Aquatic Sciences* 46: 1551-1557.
- Holtby, L.B., T.E. McMahon, and J.C. Scrivener. 1989. Stream temperatures and interannual variability in the

- emigration timing of coho salmon smolts and fry and chum salmon fry from Carnation Creek, British Columbia. *Canadian Journal of Fisheries and Aquatic Sciences* 46: 1396-1405.
- Matter, W.J., R.W. Mannan, E.W. Bianchi, T.E. McMahon, J.H. Menke, and J.C. Tash. 1989. A laboratory approach for studying emigration. *Ecology* 70: 1543-1546.
- McMahon, T.E., and J.C. Tash. 1988. Experimental analysis of the role of emigration in population regulation of desert pupfish(*Cyprinodon macularius*). *Ecology* 69: 1871-1883.
 - McMahon, T.E., and G.F. Hartman. 1988. Variation in the degree of silvering of wild coho salmon smolts migrating seaward from Carnation Creek, British Columbia. *Journal of Fish Biology* 32: 825-833.
 - Hartman, G.F., J.C. Scrivener, and T.E. McMahon. 1987. Saying that logging is either 'good' or 'bad' for fish doesn't tell you how to manage the system. *Forestry Chronicle* 63: 159-164.
 - McMahon, T.E., and R.R. Miller. 1985. Status of the fishes of the Rio Sonoyta Basin, Arizona and Sonora, Mexico. *Proceedings Desert Fishes Council* 13-15: 237-245.
 - McMahon, T.E., and J.C. Tash. 1979. Effects of formalin (buffered and unbuffered) and hydrochloric acid on fish otoliths. *Copeia* 1979: 155-156.
 - McMahon, T.E., and J.C. Tash. 1979. Use of the chemical senses by threadfin shad to detect food, predators, and conspecifics. *Journal of Fish Biology* 14: 289-296.
 - McMahon, T.E. and B.Kynard. 1979. Avoidance of an antitranspirant by mosquitofish. *Southwestern Naturalist* 24: 87-92.
 - author/coauthor, Habitat Suitability Models (1982-85) for creek chub, channel catfish, walleye, warmouth, spotted bass, coho salmon, and chum salmon. USFWS Biol. Rept. Series.
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Professional Service/Awards

- Appointed member of Future Fisheries Review Board, Montana Fish, Wildlife, and Parks, 2003-present.
- Appointed member of Excellence in Fisheries Education Award committee, 2006-2007.
 - Best Paper award nomination, *Journal of Aquatic Animal Health*, 2002.
 - Elected Western Division Representative, Education Section, American Fisheries Society, 2003-2005.
 - Elected member, Executive Committee, Montana Chapter, American Fisheries Society, 1996-1999 (consecutive terms for secretary-treasurer, vice president, president, past-pres.).
 - Associate Editor, *North American Journal of Fisheries Management*, 1996-1998.
 - Fishery Biologist of the Year award, Montana Chapter of the American Fisheries Society, 2002.
 - Best Paper award, *North American Journal of Fisheries Management*, 1996.
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Current Graduate Students

- **Andy Solcz**, Fish Passage of Yellowstone Cutthroat Trout and Rainbow Trout through Road Culverts, Upper Yellowstone River (MS).
 - **Leo Rosenthal**, Effects of Road Culverts on Eastern Montana Warmwater Fish Assemblages.(MS)
 - **Clint Muhlfeld**, Conservation and Management of Native Salmonid Species in the Upper Flathead River Drainage. (PhD)
 - **Brian Ertel**, Spawning and Rearing Life History and Movement of Yellowstone Cutthroat Trout in the Upper Yellowstone Lake Inlet Tributaries, Yellowstone National Park (MS)
- Science Advisor to Graduate Students in Masters of Science in Science Education Program:**
- **Lisa Hawkins**, science teacher, Taejon High School, Seoul, South Korea
 - **Cary Rosillo**, science teacher, West Palm Beach (FL) middle school

Past Graduate Students (date of MSU degree & present employment)

- **Nik Zymonas** (MS 2006), fishery biologist, Endangered Species Program, New Mexico Game and Fish Department, Santa Fe, NM. Thesis: Factors Affecting the Relative Abundance of Migratory and Resident Life History Forms among Lower Clark Fork River Bull Trout Populations. (Winner 2004 Student Writing Contest, American Fisheries Society for his article "Alternative Lifestyles: Bull Trout Strategies in the Northern Rockies")
- **Darin Watschke**, (MS 2006), fishery biologist, Custer National Forest, Billings, MT. Thesis:
- **Clint Sestrich** (MS 2005), fishery biologist, Gallatin National Forest, West Yellowstone, MT. Thesis: Changes in Native and Nonnative Fish Assemblages and Habitat Following Wildfire in the Bitterroot River Basin, Montana. Available at: <http://www.montana.edu/etd/available/>
- **Beth Bear** (MS 2005), fishery biologist, Wyoming Game and Fish Department, Laramie, WY. Thesis: Effects of Temperature on Survival and Growth of Westslope Cutthroat Trout and Rainbow Trout: Implications for Conservation and Restoration. Available at: <http://www.montana.edu/etd/available>
- **Drake Burford** (MS 2005), fishery biologist/stream restoration specialist, Aquatic Design & Construction, Livingston, MT. Thesis: An Assessment of Culverts as Fish Passage Barriers in a Montana Drainage Using a Multi-tiered Approach. Available at: <http://www.montana.edu/etd/available>
- **Andrew Munro** (PhD 2004), postdoctoral fellow in otolith microchemistry at University of Adelaide, School of Ocean Sciences, Australia. Dissertation: Identification of Life History Variation in Salmonids Using Otolith Microchemistry and Scale Patterns: Implications for Illegal Introductions and for Whirling Disease in Missouri River Rainbow Trout. Available at: <http://www.montana.edu/etd/available>
- **Ryen Aasheim** (MS 2004), Restoration Coordinator, Trout Unlimited, Missoula, MT
- **Dan Downing** (MS 2000), fishery biologist, Beaverhead-Deerlodge National Forest, Wisdom, MT
- **Lee Nelson** (MS 1999), westslope cutthroat trout restoration biologist, Montana Fish, Wildlife and Parks, Townsend, MT
- **Andrew Bowersox** (MS 1998), Syracuse NY high school science teacher
- **Matt Handy** (MS 1997), Trout Unlimited national headquarters, Virginia
- **Carol Endicott** (MS 1996), Yellowstone cutthroat trout recovery coordinator, Montana Fish, Wildlife and Par. Livingston MT
- **Cecil Rich** (MS 1996), Purdue University PhD/Alaska Fish and Game Dept., Habitat Division, Anchorage, AK
- **Mike Jakober** (MS 1995), fishery biologist, Bitterroot National Forest, Sula, MT
- **Steve Dalbey** (MS 1994), fishery biologist, Montana FWP, Helena, MT
- **Jim Magee** (MS 1993), Arctic grayling recovery coordinator, Montana FWP, Dillon, MT
- **Sue Ireland** (MS 1993), Director of fish and wildlife program, Kootenai Tribe of Idaho

Advice for Prospective Graduate Students:

(See article by Al Zale et al. "[Getting a Job or Assistantship: How to Surpass the Competition](#)"):

Fish Links

[Montana Chapter American Fisheries Society \(AFS\)](#)--(includes job links)

[AFS homepage](#)--(includes job links)

[Montana Fish, Wildlife, and Parks](#)

[Whirling Disease Foundation](#)

[Wild Trout Lab, Montana State University](#)

[Montana Water Resources Center](#)

Back to the MSU [Fish and Wildlife Program](#), the MSU [Ecology Department](#), or [Montana State University](#).

