

# RYAN S. KING

Associate Professor  
Department of Biology  
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## RESEARCH INTERESTS

Aquatic community ecology (ecological community thresholds, novel environmental gradients, new techniques in multivariate community analysis);  
Stream biogeochemistry and food webs (energy pathways, consumer–resource stoichiometry, consumer-mediated nutrient recycling);  
Landscape ecology (watershed linkages to stream ecosystem processes, urbanization, spatial arrangement of land cover, scaling issues)

## EDUCATION

**DOCTOR OF PHILOSOPHY**, Ecology, September 2001  
Department of the Environment, Duke University, Durham, NC  
*Dissertation*: Dimensions of invertebrate assemblage organization across a phosphorus-limited Everglades landscape.  
*Advisor*: Curtis J. Richardson. *Concentration*: Community and landscape ecology.

**MASTER OF ENVIRONMENTAL MANAGEMENT**, May 1996  
Nicholas School of the Environment, Duke University  
*Thesis*: Spatial and diel variability in the availability of flying insects as duckling food in prairie pothole wetlands of North Dakota.  
*Advisor*: Robert G. Qualls. *Concentration*: Water resources management.

**BACHELOR OF SCIENCE**, *summa cum laude*, August 1994  
Harding University, Searcy, AR  
*Major*: Biology. *Thesis*: Relationship between rainbow trout food habits and benthic macroinvertebrates in the Greer's Ferry Tailwater, Arkansas.

## PROFESSIONAL EXPERIENCE

**Associate Professor**, Department of Biology, Baylor University. August 2009 – .  
**Visiting Scholar**, Institute for the Environment, University of North Carolina, Chapel Hill. 2010.  
**Assistant Professor**, Department of Biology, Baylor University. 2004 – 2009.  
**Ecologist**, Smithsonian Environmental Research Center, Edgewater, MD. 2001–2004.  
**Research Associate**, Duke Wetland Center, Nicholas School of the Environment, Duke University. 1996–2001  
**NNEMS Fellow**, Wetland Function Group, Mid-Continent Ecology Division, United States Environmental Protection Agency, Duluth, MN. 1995 – 1996.

## COURSES TAUGHT

**Advanced Ecological Data Analysis** (BIO 5413). Baylor University. Lecture/lab, 4 credits (6 contact hrs/week).  
**Stream Ecology** (BIO 5405). Baylor University. Lecture/lab. 4 credits (6 contact hours/week).  
**Aquatic Biology** (BIO 4406). Baylor University. Lecture/lab, 4 credits (9 contact

hrs/week).

**Modern Concepts of Bioscience II** (BIO 1306). Baylor University, Lecture. 3 credits (3 contact hours/week, 150 seats).

**Foundations of Ecology** (BIO 5100-2). Baylor University. Graduate seminar. 1 credit (1.5 contact hrs/week).

**Teaching Assistant, Multivariate Analysis in Community and Landscape Ecology**, Nicholas School of the Environment, Duke University. 2000.

## PROFESSIONAL AND SERVICE ACTIVITIES

**Principal Investigator and Director** of the Baylor Experimental Aquatic Research (BEAR) stream facility at the Lake Waco Wetlands. Led design, construction, and implementation of twelve 0.6-m wide x 20 m long artificial streams, one of the largest experimental facilities of its kind in North America. 2005 –.

**Interim Graduate Program Director**, The Institute of Ecological, Environmental, and Earth Sciences. 2008-2009

**Executive Committee**, North American Benthological Society. 2009 – .

**Associate Editor**, *Journal of the North American Benthological Society*. 2003–2006.

**Manuscript Referee**: *Annals of the Entomological Society of America; Aquatic Microbial Ecology; Archiv für Hydrobiologie; Biogeochemistry; Ecological Applications; Ecological Monographs; Ecology; Ecology of Freshwater Fish, Ecosystems; Environmental Entomology; Environmental Management; Hydrobiologia; Journal of Applied Ecology; Journal of Environmental Quality; Journal of the North American Benthological Society; Kluwer Academic Monograph Series; Lakes and Reservoirs: Research and Management; Limnology and Oceanography; Methods in Ecology and Evolution, Oikos, Plant Ecology, Science of the Total Environment, Soil Science Society of America Journal, Southeastern Naturalist; Springer-Verlag Ecological Monograph Series; United States Environmental Protection Agency; Wetlands*

**Proposal Referee/Grant Panelist**: National Science Foundation, US Environmental Protection Agency

**Brazos River Basin and Bay Expert Science Team**, member, 2010 –.

**Review Team Member**, Texas Instream Flow Desktop Methodology, Texas Commission on Environmental Quality. 2007 – 2008.

**Workgroup Member**, Healthy Watersheds, US Environmental Protection Agency, 2010 - .

**Workgroup Member**, Tiered Aquatic Life Use (TALU), Subhumid Agricultural Plains (SAP), US Environmental Protection Agency Region 6. 2006 – ;

**Workgroup Member**, Regional Technical Advisory Group (RTAG), Nutrient Criteria, US Environmental Protection Agency Region 6. 2004 – .

**Workgroup Member**, Maryland Biological Stream Survey, Maryland Department of Natural Resources, Annapolis, MD. 2003-2004.

**Workgroup Member**, Biological Assessment of Wetlands Workgroup (BAWWG), US Environmental Protection Agency, Washington, DC. 1997–2001.

**Peer-Review Consultant**, United States Environmental Protection Agency “State of Science” publications. Reviews conducted through Versar, Inc., Springfield, VA. 2000–2001, 2003, 2007.

**Scientific Society Member**: Ecological Society of America; North American Benthological Society; Society of Wetland Scientists; Texas Academy of Sciences; Texas River and Reservoir Management Society.

**Scientific Advisory Board**, The Institute of Ecological, Earth, and Environmental

Sciences (TIE<sup>3</sup>S), Baylor University. 2006 – .  
**Graduate Committee**, Department of Biology, Baylor University. 2006 – 2008.  
**Library Committee**, Department of Biology, Baylor University. 2004 – .  
**Webpage Committee**, Department of Biology, Baylor University. 2004–.  
**Director**, Native Plant Sale, Baylor Biological Honor Society (Tri-Beta), Baylor University. 2008–.  
**Advisor**, Delta Phi Omega national sorority, Baylor University.  
**Faculty Partner** for undergraduate dormitory (Dawson Hall) community leader (CL), 2008-2009.

## PUBLICATIONS

\*students

- King, R. S.**, M. E. Baker, P. F. Kazyak, and D. E. Weller. How novel is too novel? Stream community thresholds at exceptionally low levels of watershed urbanization. *Ecological Applications*. doi:10.1890/10-1357.1.
- Shaftel, R. S.\*, **R. S. King**, and J. A. Back\*. Breakdown rates, nutrient quality, and macroinvertebrate colonization of bluejoint grass litter in headwater streams of the Kenai Peninsula, Alaska. *Journal of the North American Benthological Society*
- Shaftel, R.S.\*, **R. S. King**, and J. A. Back\*. Alder cover drives nitrogen availability in Kenai Peninsula headwater streams, Alaska. *Biogeochemistry* doi: 10.1007/s10533-010-9541-3
- King, R. S.**^ and M. E. Baker^. 2011. An alternative view of ecological community thresholds and appropriate analyses for their detection. *Ecological Applications* doi:10.1890/10-0882.1 ^equal contributors
- King, R. S.**^ and M. E. Baker^. 2010. Considerations for analyzing ecological community thresholds in response to anthropogenic environmental gradients. *Journal of the North American Benthological Society* 29:998-1008. ^Joint first-authors,
- Dodds, W.K., W. H. Clements, K. Gido, B. Hilderbrand, and **R. S. King**. 2010. Thresholds, breakpoints, and nonlinearities in aquatic ecosystems as related to management. *Journal of the North American Benthological Society* 29:988-997.
- Baker, M. E.^ and **R. S. King**^. 2010. A new method for identifying and interpreting biodiversity and ecological community thresholds. *Methods in Ecology and Evolution* 1.25-37. Press coverage: *NPR, Baltimore Sun, Yahoo News, Environmental Protection Magazine*.
- ^Joint first-authors, listed in alphabetical order.
- Whigham, D.F., M. C. Whigham, I. Feller, W. Rodriguez, and **R. S. King**. 2009. Ecological characteristics of *Batis maritima* in Florida and Belize. *Smithsonian Contributions to Marine Sciences* 38: 491-499.
- Fulton, B. A.\*, R. A. Brain, S. Usenko, J. A. Back\*, **R. S. King**, and B. W. Brooks. 2009 Influence of N and P concentrations and ratios on *Lemna gibba* growth responses to triclosan in laboratory and stream mesocosm experiments. *Environmental Toxicology and Chemistry* 28:2610-2621
- Scott, J. T.\*, D. A. Lang\*, **R. S. King**, and R. D. Doyle. 2009. Nitrogen fixation and phosphatase activity in periphyton growing on nutrient diffusing substrata: Evidence for differential nutrient limitation in stream benthos. *Journal of the North American Benthological Society* 28:57-68.
- DeLuca, W. V., C. Studds, **R. S. King**, P. P. Marra. 2008. Coastal development and the integrity of estuarine waterbird communities: threshold responses and the importance of scale. *Biological Conservation* 141:2669-2678.
- Richardson, C. J., **R. S. King**, S. S. Qian, P. Vaithyanathan, R. G. Qualls, and C. A. Stow. 2008. Response to comment on “Estimating ecological thresholds for phosphorus in the Everglades”. *Environmental Science & Technology* 42: 6772-6773.

- Back, J. A.\*, J. M. Taylor\*, **R. S. King**, E. Hintzen\*, and K. Fallert\*. 2008. Ontogenetic differences in mayfly stoichiometry influence growth rates in response to phosphorus. *Fundamental and Applied Limnology (Archiv fur Hydrobiologie)* 171:233-240.
- Scott, J. T.\*, J. A. Back\*, J. M. Taylor\*, and **R. S. King**. 2008. Does nutrient enrichment decouple algal-bacterial production in periphyton? *Journal of the North American Benthological Society* 27:332-334.
- King, R. S.** and C. J. Richardson. 2008. Macroinvertebrate responses along a gradient of long-term nutrient additions and altered hydroperiod. Pp 277-320 In: *The Everglades Experiments: Lessons for Ecosystem Restoration (Ecological Studies 201)*, C. J. Richardson. New York. Springer-Verlag.
- King, R. S.** and C. J. Richardson. 2008. Macroinvertebrate and fish responses to experimental P additions in Everglades sloughs. Pp 477-504 In: *The Everglades Experiments: Lessons for Ecosystem Restoration (Ecological Studies 201)*, C. J. Richardson. New York. Springer-Verlag.
- Richardson, C. J., **R. S. King**, S. S. Qian, P. Vaithyanathan, R. G. Qualls, and C. A. Stow. 2008. An ecological basis for establishment of a phosphorus threshold for the Everglades ecosystem. Pp 595-620 In: *The Everglades Experiments: Lessons for Ecosystem Restoration (Ecological Studies 201)*, C. J. Richardson. New York. Springer-Verlag.
- Kaštovský, J., K. Kaštovsk , M. Bastl, J. Vymazal, and **R. S. King**. 2008. Experimental assessment of phosphorus effects on algal assemblages in dosing mesocosms. Pp 461-476 In: *The Everglades Experiments: Lessons for Ecosystem Restoration (Ecological Studies 201)*, C. J. Richardson. New York. Springer-Verlag.
- Richardson, C. J., **R. S. King**, J. Vymazal, E. A. Romanowicz, and J W. Pahl. 2008. Macrophyte community responses in the Everglades with an emphasis on cattail (*Typha domingensis*) and sawgrass (*Cladium jamaicense*) interactions along a gradient of long-term nutrient additions, altered hydroperiod and fire. Pp 215-260 In: *The Everglades Experiments: Lessons for Ecosystem Restoration (Ecological Studies 201)*, C. J. Richardson. New York. Springer-Verlag.
- King, R. S.**, and C. J. Richardson. 2007. Subsidy-stress response of macroinvertebrate-assemblage biomass to a phosphorus gradient in an oligotrophic wetland ecosystem. *Journal of the North American Benthological Society* 26:491-508.
- Richardson, C. J., **R. S. King**, S. S. Qian, P. Vaithyanathan, R. G. Qualls, and C. A. Stow. 2007. Estimating ecological thresholds for phosphorus in the Everglades. *Environmental Science & Technology* 41:8084-8091 (cover photo, featured paper). Press coverage: *American Chemical Society*
- King, R. S.**, D. F. Whigham, W. V. DeLuca, and P. P. Marra. 2007. Threshold effects of coastal urbanization on *Phragmites australis* (common reed) abundance and foliar nitrogen in Chesapeake Bay. *Estuaries and Coasts* 30:469-481 (cover photo, featured paper). Press coverage: *Coastal and Estuarine News*.
- Rosenberg, D. M., V. H. Resh, and **R. S. King**. 2007. Use of aquatic insects in biomonitoring. pp. 123-137 In: R. W. Merritt and K. W. Cummins (editors). *An Introduction to the Aquatic Insects of North America, 4<sup>th</sup> Edition*. Kendall/Hall, Dubuque, IA, USA.
- King, R. S.**, M. E. Baker, D. F. Whigham, D. E. Weller, T. E. Jordan, P. F. Kazyak, and M. K. Hurd. 2005. Spatial considerations for linking watershed land cover to ecological indicators in streams. *Ecological Applications* 15:137-153. Press coverage: *Faculty of 1000* (recommended).

- King, R. S.**, A. H. Hines, F. D. Craige, and S. Grap\*. 2005. Regional, watershed, and local correlates of blue crab and bivalve abundances in subestuaries of Chesapeake Bay, USA. *Journal of Experimental Marine Biology and Ecology* 319:101-116. Press coverage: *Bay News Journal*.
- King, R. S.**, J. Beaman, D. F. Whigham, A. H. Hines, M. E. Baker, and D. E. Weller. 2004. Watershed land use is strongly linked to PCBs in white perch in Chesapeake Bay subestuaries. *Environmental Science & Technology* 38:6546-6552. Press coverage: *Smithsonian Magazine*.
- King, R. S.**, C. J. Richardson, D. L. Urban, and E. A. Romanowicz. 2004. Spatial dependency of vegetation-environment linkages in an anthropogenically influenced wetland ecosystem. *Ecosystems* 7:75-97 (cover photo, featured paper).
- Qian, S. S., Y. Pan, and **R. S. King**. 2004. Soil phosphorus threshold in the Everglades: a Bayesian changepoint analysis for multinomial response data. *Ecological Indicators* 4:29-37.
- King, R. S.** and C. J. Richardson. 2003. Integrating bioassessment and ecological risk assessment: an approach to developing numerical water-quality criteria. *Environmental Management* 31:795-809.
- Qian, S. S., **R. S. King**, and C. J. Richardson. 2003. Two statistical methods for the detection of environmental thresholds. *Ecological Modelling* 166:87-97.
- King, R. S.** and C. J. Richardson. 2002. Evaluating subsampling approaches and macroinvertebrate taxonomic resolution for wetland bioassessment. *Journal of the North American Benthological Society* 21:150-171.
- King, R. S.**, K. T. Nunnery, and C. J. Richardson. 2000. Macroinvertebrate assemblage response to highway crossings in forested wetlands: implications for biological assessment. *Wetlands Ecology and Management* 8:243-256.
- Lemly, A. D. and **R. S. King**. 2000. An insect-bacteria bioindicator for assessing detrimental nutrient enrichment in wetlands. *Wetlands* 20:91-100.
- King, R. S.** and J. C. Brazner. 1999. Coastal wetland insect communities along a trophic gradient in Green Bay, Lake Michigan. *Wetlands* 19:426-437.
- King, R. S.** and D. A. Wrubleski. 1998. Spatial and diel availability of flying insects as potential duckling food in prairie wetlands. *Wetlands* 18:100-114.

## MANUSCRIPTS IN REVIEW OR PREP.

\* students

- Stanley, C. E.\*, **R. S. King**, and J. M. Taylor\*. Coupling fish community succession with changes in physical habitat driven by interannual variability in stream discharge. In review.
- Taylor, J. M.\*, J. A. Back\*, and **R. S. King**. Grazing-fish exclusion reveals strong influence of sediment removal on periphyton growth and stoichiometric response to nutrients in experimental streams. In review.
- Pease, A.\*, J. M. Taylor\*, **R. S. King**, and K. O. Winemiller. Environmental influences on fish community structure at multiple spatial scales in central Texas streams. In review.
- Bernhardt, E. S., B. D. Lutz, C. A. Carter, **R. S. King**, M. A. Palmer, J. P. Fay, D. Campagna, J. Amos. How many mountains can we mine? Ecological thresholds for freshwater ecosystems of the Central Appalachians. In review.
- Studds, C. E., W. V. DeLuca, M. E. Baker, **R. S. King**, and P. P. Marra. Land cover and climatic variation interact to shape waterbird community integrity. In review.
- Valenti, T. W.\*, J.M. Taylor\*, J.A. Back\*, **R.S. King**, and B. W. Brooks. Hydrological and nutrient influences on diel pH in wadeable streams: Implications for ecological risk assessment of ionizable contaminants. In review.

- King, R. S.**, J. T. Scott, and D. A. Lang\*. Response of nitrogen fixation and alkaline phosphatase activity in periphyton growing on nutrient diffusion substrata across a gradient of stream nutrient enrichment.
- King, R. S.**, C. M. Walker, D. F. Whigham, S. Baird, and J. A. Back\*. Watershed physiography drives macroinvertebrate community structure and juvenile salmonid distributions in Kenai lowland headwater streams, Alaska.
- Whigham, D. W., C. M. Walker, **R. S. King**, and S. Baird. Vegetation patterns associated with first-order streams in the Kenai Lowlands, Alaska.
- Walker, C. M., **R. S. King**, Whigham, D. W., and S. Baird. Watershed-scale connections between wetlands and stream chemistry in the Kenai Lowlands, Alaska.
- Dekar, M.P., **R. S. King**, C. M. Walker, D. W. Whigham, and J. A. Back\*. Grass-fed salmon? Using carbon and hydrogen stable isotopes to identify energy pathways in Kenai Peninsula stream food webs.
- Taylor, J. M.\*, J. A. Back, T. W. Valenti, and **R. S. King**. Experimental evidence for fish-mediated nutrient recycling in streams.
- King, R. S.**, J. A. Back\*, and J. M. Taylor\*. Synchronous responses of periphyton autotrophy, nutrient stoichiometry and species composition reveal stream community thresholds at low levels of phosphorus enrichment.

## GRANTS AND CONTRACTS

- Alaska Sustainable Salmon Fund. *Tools for ecosystem-based management of wetlands on the Kenai Lowlands, Alaska: Understanding upland-wetland-stream connection*. C. Walker, **R. S. King**, D. F. Whigham, M. Rains. \$299,824. 2010-2012.
- University Research Committee (URC), Baylor University. *Using stable hydrogen isotopes to identify energy pathways in small streams of the Kenai Peninsula, Alaska*. **R.S. King (PI)**. \$7,500. 2009-2010
- Texas Commission on Environmental Quality (TCEQ). *Development of biological indicators of nutrient enrichment for application to Texas streams, phase II*. **R.S. King (PI)**. \$34,000. 2008-2009.
- U. S. EPA – Regional Wetlands Grant Program via Alaska Department of Fish and Game. *Headwater stream wetland settings and shallow ground water influence: relationships to juvenile salmon habitat on the Kenai Peninsula, Alaska*. C. Walker (PI), **R. S. King (co-PI)**, D. F. Whigham (co-PI), M. Rains (co-PI). \$139,997. 2007-2009.
- Texas Commission on Environmental Quality (TCEQ). *Development of biological indicators of nutrient enrichment for application to Texas streams*. **R.S. King (PI)**. \$46,769. 2007-2008.
- Texas Commission on Environmental Quality (TCEQ) via Texas A&M University. *Refinement and Validation of Habitat Quality Indices (HQI) and Aquatic Life Use (ALU) Indices for Application to Assessment and Monitoring of Texas Surface Waters*. K. Winemiller (PI), **R.S. King (co-PI)**. \$385,500. 2006-2009.
- U. S. EPA – Water Quality Cooperative Agreement Program. *Linking observational and experimental approaches for the development of regional nutrient criteria for wadeable streams*. **R. S. King (PI)** and B. W. Brooks (co-PI). \$155,000. 2006-2007.
- U.S. EPA – Science to Achieve Results (STAR) Program via Smithsonian Environmental Research Center (D. E. Weller, SERC PI). *A watershed classification system for improved monitoring and restoration: landscape indicators of watershed impairment*. **R. S. King (PI)**, Baylor subcontract) \$20,116. 2006.
- U. S. EPA – Regional Wetlands Grant Program via Alaska Fish and Game Department. *The functional significance of low-order streams and associated*

- riparian wetlands in supporting fish and invertebrate populations in the Kenai Lowlands, Alaska: Attributing the Kenai Lowlands Wetland Management Tool.* C. Walker (PI), D. F. Whigham (co-PI), **R. S. King (co-PI)**. \$81,630. 2006-2007.
- Baylor University – University Research Committee. *Influence of riparian wetlands on sources and quality of food for juvenile salmon in headwater streams of southeast Alaska.* \$6,000. **R. S. King (PI)**. 2006-2007.
- Altria Group, Inc. – 2004 Environment/Water Conservation. *Baylor Experimental Aquatic Research support grant.* **R. S. King (PI)**, B. W. Brooks, R. D. Doyle. \$35,000. 2005-2006.
- Baylor University – Faculty Research Investment Program. *A flow-injection autoanalysis system to support multidisciplinary aquatic research at Baylor.* \$15,000. **R. S. King (PI)**, B. W. Brooks, R. D. Doyle. 2004-2005.
- U.S. EPA – Science to Achieve Results (STAR) Program via Smithsonian Environmental Research Center (D. F. Whigham, SERC PI). *Ecological and socioeconomic indicators for integrated assessment of aquatic ecosystems of the Atlantic Slope.* **R. S. King (PI)**, Baylor subcontract). \$19,953. 2005.
- Center for Transportation and the Environment Graduate Fellowship. *A functional and biological assessment of wetland ecosystem response to highways: before, during, and after construction.* \$15,000. **R. S. King**. 1999-2000.
- U. S. EPA — National Network for Environmental Management Studies Fellowship. *The effects of sedimentation, turbidity, and vegetation microhabitat structure on availability of emerging insects as duckling food in prairie wetlands.* \$6,000. **R. S. King**. 1995.

**PRESENTATIONS  
(FIRST AUTHOR  
ONLY)**

- King, R. S. Synchronous changes in periphyton autotrophy, carbon:nutrient ratios, and species composition reveal stream ecosystem thresholds at low levels of phosphorus enrichment. Smithsonian Environmental Research Center, December 2010 **(Invited)**.
- King, R. S. An alternative view of ecological community thresholds and appropriate analyses for their detection. UNC Institute for the Environment, November 2010 **(Invited)**.
- King, R. S. Wetlands are strongly linked to headwater stream ecosystems in the Kenai Lowlands, Alaska. Duke University Wetland Center Speaker Series, November 2010. **(Invited)**
- King, R. S. Effects of urbanization on stream communities. Kachemak Bay Research Reserve seminar series, October 2010. **(Invited)**
- King, R. S. Linking observational and experimental approaches for the development of regional nutrient criteria for Wadeable Streams. Texas Parks and Wildlife Regional Directors meeting, Buda, TX. June 2010. **(Invited)**
- King, R. S, and M. E. Baker. Considerations for analyzing ecological community thresholds in response to anthropogenic environmental gradients. Joint meeting of ASLO/NABS, Santa Fe, NM. June 2010.
- King, R. S. Linking observational and experimental approaches for the development of regional nutrient criteria for Wadeable Streams. Regional Technical Advisory Group (RTAG) for nutrient criteria, EPA Region 6, Dallas, TX. February 2010. **(Invited)**
- King, R. S. Linking observational and experimental approaches for the development of regional nutrient criteria for Wadeable Streams. Webcast and conference call presentation to regional nutrient coordinators from all EPA regions and headquarters. October 2009. **(Invited)**

- King, R. S. Wetland linkages to juvenile salmon habitat in headwater streams of the Kenai lowlands, Alaska. Dept of Biology Seminar Series, Baylor University. September 2009. **(Invited)**
- King, R. S., and M. E. Baker. Threshold Indicator Taxa Analysis (TITAN): A simple method for identifying and interpreting ecological community thresholds. 57<sup>th</sup> Annual Meeting of the North American Benthological Society, Grand Rapids, MI. May 2009.
- King, R. S. Watershed urbanization and ecological community thresholds in streams. Department of Wildlife and Fisheries Seminar, Texas A & M University, College Station, TX. November 2008 **(Invited)**.
- King, R. S. Attack of the clones! Urbanization thresholds and *Phragmites* invasion of North American tidal wetlands. Ecological Thresholds Workshop, USGS/NPS, Duluth, MN. April 2008. **(Invited)**
- King, R. S. Additive indicator species on environmental gradients: a new technique for estimating ecological thresholds. Ecological Thresholds Workshop, USGS/NPS, Duluth, MN. April 2008. **(Invited)**
- King, R. S., J. A. Back, C. M. Walker, S. Baird, and D. F. Whigham. Wetland linkages to juvenile salmonids and macroinvertebrate communities in headwater streams of the Kenai Peninsula, Alaska. Department of Biology, Southwestern University, Georgetown, TX. November 2007. **(Invited)**
- King, R. S. Nutrient and habitat criteria in central Texas streams: new perspectives. Subhumid Agricultural Plains TALU workgroup meeting, USGS, Austin, TX. November 2007. **(Invited)**
- King, R. S., J. A. Back, C. M. Walker, S. Baird, and D. F. Whigham. Wetland geomorphic linkages to juvenile salmonids and macroinvertebrate communities in headwater streams of the Kenai lowlands, Alaska. 55<sup>th</sup> Annual Meeting of the North American Benthological Society, Columbia, SC. June 2007.
- King, R. S. Watershed urbanization, nutrient enrichment, and ecological thresholds in streams. Special symposium on urbanization and water resources. Joint meeting of the Texas River and Reservoir Management Society (TRRMS) and Society of Environmental Toxicology and Chemistry (SETAC), SF Austin University, acogdoches, TX. May 2007. **(Invited)**
- King, R. S. Urbanization, nutrients, and ecological thresholds in streams. Biology Seminar, University of North Texas, Denton, TX. April 2007. **(Invited)**
- King, R. S. Nutrient criteria development in central Texas streams. U. S. EPA Region 6, Regional Technical Advisory Group (RTAG), Dallas, Texas. February 2007. **(Invited)**
- King, R. S. Aquatic research at Baylor: nutrient criteria, landscapes, and ecological thresholds. Baylor-USGS roundtable meeting, U. S. Geological Service, Austin, TX. January 2007 .
- King, R. S. Urbanization and ecological thresholds in freshwater and estuarine ecosystems. Water Initiative Symposium (campus wide), Utah State University, Logan, UT, November 2006 **(Invited)**.
- King, R. S. and K. O. Winemiller. Developing and refining habitat quality and fish community indices for assessment of surface waters in Texas. Subhumid Agricultural Plains TALU workgroup meeting, USGS, Austin, TX. November 2006. **(Invited)**
- King, R. S. Linking observational and experimental approaches for the development of numerical nutrient criteria in wadeable streams. TPWD nutrient criteria workgroup, Baylor. October 2006.
- King, R. S. Estimating ecological thresholds for developing tiered aquatic life

- use (TALU) designations for Wadeable streams. Subhumid Agricultural Plains TALU workgroup meeting, USGS, Austin, TX. October 2005 (Invited).
- King, R. S., M. E. Baker, D. F. Whigham, et al. Watershed urbanization and ecological thresholds in streams: influences of physiography, watershed size, and spatial arrangement of impervious cover. INTECOL-ESA meeting, Montreal, Canada, August 2005
- King, R. S., D. F. Whigham, W. V. DeLuca, et al. Linking watershed land cover to ecological indicators in streams and subestuaries of Chesapeake Bay. 53th Annual Meeting of the North American Benthological Society, New Orleans, LA. May 2005.
- King, R. S., M. E. Baker, D. F. Whigham, et al. Watershed urbanization and biological thresholds in streams: influences of physiography, watershed size and spatial arrangement of impervious cover. Texas River and Reservoir Management Society Meeting, Waco, TX. May 2005.
- King, R. S. Estimating ecological thresholds for the development of numerical nutrient criteria. Special Symposium and Panel Discussion on Nutrient Criteria, South Central Annual Meeting of the Society of Environmental Toxicology and Chemistry, Balcones Springs, TX. May 2005. **(Invited)**
- King, R. S., J. R. Beaman, D. F. Whigham et al. Urbanization of estuarine watersheds is strongly linked to elevated PCBs in white perch. 4th All EaGLes Meeting, U.S. EPA STAR Program, Duluth, MN. September 2004.
- King, R. S., M. E. Baker, D. F. Whigham, et al. Land-use thresholds and stream macroinvertebrate assemblages: influences of physiography, watershed size, and spatial arrangement. 52nd Annual Meeting of the North American Benthological Society, Vancouver, BC, Canada, June 2004.
- King, R. S., D. F. Whigham, et al. Linking watershed land use to ecological indicators in streams and subestuaries of Chesapeake Bay. Versar, Inc., Columbia, Maryland, April 2004 **(Invited)**.
- King, R. S., D. F. Whigham et al. Linking watershed land use to ecological indicators in streams and subestuaries of Chesapeake Bay. Maryland Stream Monitoring Roundtable Meeting, Baltimore, Maryland. February 2004 **(Invited)**.
- King, R. S. Integrating bioassessment and ecological risk assessment for the development of numerical nutrient criteria for surface waters. United States Environmental Protection Agency, National Risk Management Research Laboratory, Ada, OK, February 2004 **(Invited)**.
- King, R. S. Phosphorus enrichment in the Everglades: Linkages among vegetation pattern, resource limitation, and aquatic consumers. Department of Biology, Baylor University, Waco, TX, January 2004 **(Invited)**.
- King, R. S., D. F. Whigham et al. A watershed approach to linking watershed land use to ecological indicators in streams and estuaries. 3rd All EaGLes Meeting, U.S. EPA STAR Program, Bodega Bay, California, December 2003.
- King, R. S., D. F. Whigham et al. Linking watershed land use to ecological indicators in streams and subestuaries of Chesapeake Bay. 6th Annual Baltimore Ecosystem Study Meeting (Baltimore LTER), Baltimore, Maryland, October 2003.
- King, R. S., M. E. Baker, D. F. Whigham et al. Spatial considerations for linking watershed land cover to ecological indicators in streams. Special session on ecological indicators, International Association for Landscape Ecology World Congress, Darwin, Australia, July 2003 **(Invited)**.
- King, R. S., A. H. Hines, S. Grap, and D. F. Craige. Correlates of bivalves and blue crabs in subestuaries of Chesapeake Bay, USA. Annual Meeting of The Crustacean Society, Williamsburg, VA, June 2003.

- King, R. S., M. E. Baker, D. F. Whigham, et al. Influence of spatial factors on linkages among watershed landcover, environmental conditions, and macroinvertebrate assemblages in coastal-plain streams. 51<sup>st</sup> Annual Meeting of the North American Benthological Society, Athens, GA, May 2003.
- King, R. S., and C. J. Richardson. Detecting changepoints in biological attributes: an approach to developing numerical water-quality criteria. Special session on diagnosing causes of impairment in aquatic ecosystems, 50<sup>th</sup> Annual Meeting of the North American Benthological Society, Pittsburgh, PA, May 2002
- King, R. S. Dimensions of invertebrate assemblage organization across a phosphorus-limited Everglades landscape. Smithsonian Environmental Research Center's Winter Seminar Series, Edgewater, MD, January 2002 **(Invited)**.
- King, R. S., and C. J. Richardson. Evaluating subsampling approaches and macroinvertebrate taxonomic resolution for wetland bioassessment. 49<sup>th</sup> Annual Meeting of the North American Benthological Society, LaCrosse, WI. June 2001.
- King, R. S., C. J. Richardson, D. L. Urban, and E. A. Romanowicz. Spatial dependency of vegetation-environment relationships in an anthropogenically influenced wetland landscape. 7<sup>th</sup> International Symposium of the Biogeochemistry of Wetlands, Durham, NC. June 2001.
- King, R. S., and C. J. Richardson. Evaluating subsampling approaches and macroinvertebrate taxonomic resolution for wetland bioassessment. Assessing the Health of Wetland Life: Policy, Science, and Practice, Orlando, FL. May 2001.
- King, R. S., and C. J. Richardson. Macroinvertebrate and fish responses to experimental P additions in Everglades sloughs. Special session on Everglades restoration, Millennium Wetland Event, INTECOL's 6<sup>th</sup> Wetland Meeting, Quebec, Quebec, Canada, August 2000.
- King, R. S., and C. J. Richardson. Influence of experimental P additions on invertebrate assemblages in sloughs of the northern Everglades. Society of Wetland Scientists 20<sup>th</sup> Annual Meeting, Norfolk, VA. June 1999.
- King, R. S., and C. J. Richardson. Invertebrate assemblage response to experimental phosphorus dosing in the Everglades. 47<sup>th</sup> Annual Meeting of the North American Benthological Society, Duluth, MN. May 1999.
- King, R. S., K. T. Nunnery, and C. J. Richardson. Macroinvertebrate community response to highway crossings in forested wetlands: implications for biological assessment. Connections '98: Water Quality, Wetlands, and Transportation, New Bern, NC. September 1998.
- King, R. S., K. T. Nunnery, and C. J. Richardson. A comparison of methods and metrics for assessment of wetland macroinvertebrate community response to highways. 45<sup>th</sup> Annual Meeting of the North American Benthological Society, San Marcos, TX. June 1997.
- King, R. S., and D. A. Wrubleski. Diel and spatial variability in the availability of flying insects as duckling food in prairie pothole wetlands. 44<sup>th</sup> Annual Meeting of the North American Benthological Society, Kalispell, MT, USA. June 1996.
- King, R. S., and D. A. Wrubleski. Diel and spatial variability in the availability of flying insects as duckling food in prairie pothole wetlands. U. S. Environmental Protection Agency, Duluth, MN, USA. May 1996.

## STUDENT PRESENTATIONS

- Back, J. A., J. M. Taylor, and R. S. King. Sex and size matter: ontogenic controls on carbon, nitrogen and phosphorus stoichiometry in aquatic macroinvertebrates. . Joint meeting of ASLO/NABS, Santa Fe, NM. June 2010.
- Taylor, J. M., J. A. Back, T. W. Valenti, and R. S. King. Evidence for fish-mediated nutrient recycling in experimental streams. Joint meeting of ASLO/NABS, Santa Fe, NM. June 2010.
- Shaftel, R. S., **R. S. King**, and J. A. Back. Alder drives nitrogen availability, breakdown rates, and macroinvertebrate colonization of grass litter in Kenai Lowland headwater streams, Alaska. Joint meeting of ASLO/NABS, Santa Fe, NM. June 2010.
- Taylor, J. M., J. A. Back, and **R. S. King**. Periphyton response to nutrient enrichment in a stoneroller-dominated world. Poster presentation on Capitol Hill. One of 20 students selected by US EPA to present their EPA-funded research to Congress. Washington, DC.. October 2009. **(Invited)**
- Taylor, J. M. and **R. S. King**. Periphyton response to nutrient enrichment in a stoneroller-dominated world. 57<sup>th</sup> Annual Meeting of the North American Benthological Society, Grand Rapids, MI. May 2009
- Back, J. A. and **R. S. King**. Ontogenetic patterns of phosphorus content in aquatic macroinvertebrates with differing life-history traits. 56<sup>th</sup> Annual Meeting of the North American Benthological Society, Salt Lake City, UT. May 2008.
- Taylor, J. M., C. E. Stanley, and **R. S. King**. Factors structuring fish communities in central Texas streams. 56<sup>th</sup> Annual Meeting of the North American Benthological Society, Salt Lake City, UT. May 2008.
- Stanley, C. E., J. M. Taylor, and **R. S. King**. Coupling changes in physical habitat and fish community structure between two interannual extremes in stream discharge. 56<sup>th</sup> Annual Meeting of the North American Benthological Society, Salt Lake City, UT. May 2008.
- Back, J. A., and **R. S. King**. Periphyton nutrient composition as a robust measure of nutrient status in streams. 55<sup>th</sup> Annual Meeting of the North American Benthological Society, Columbia, SC. June 2007.
- Taylor, J. M., J. A. Back, **R. S. King**, K. L. Fallert, and E. H. Hintzen. Ontogenetic changes in elemental ratios and growth rates of *Caenis* spp. (Ephemeroptera: Caenidae) in response to phosphorus enrichment. 55<sup>th</sup> Annual Meeting of the North American Benthological Society, Columbia, SC. June 2007.
- Lang, D. A., J. T. Scott, **R. S. King**, and R. D. Doyle. Evaluation of a nutrient-diffusing substrata design to estimate the effects of nutrient enrichment on alkaline phosphatase activity and nitrogen fixation. 55<sup>th</sup> Annual Meeting of the North American Benthological Society, Columbia, SC. June 2007.
- Taylor, J. M., K. Fallert, and **R. S. King**. Phosphorus limitation of growth varies across developmental classes of the mayfly *Caenis* spp. Texas Academy of Sciences Meeting, Baylor University, Waco, TX. March 2007.
- Back, J. A., E. Hintzen, and **R. S. King**. A comparison of carbon, nitrogen, and phosphorus stoichiometry among developmental classes of the mayfly *Caenis* spp. Texas Academy of Sciences Meeting, Baylor University, Waco, TX. March 2007. (HONORABLE MENTION STUDENT AWARD)
- Lang, D. A., J. T. Scott, and **R. S. King**. Effects of nutrient enrichment on alkaline phosphatase activity and nitrogen fixation using novel nutrient diffusing substrata. Texas Academy of Sciences Meeting, Baylor University, Waco, TX. March 2007.
- Back, J. A., and **R. S. King**. Response of stream macroinvertebrate assemblages to nutrients within the tiered aquatic life use (TALU) framework. Special

session on developing nutrient criteria for aquatic ecosystems, 53<sup>rd</sup> Annual Meeting of the North American Benthological Society, New Orleans, LA. May 2005 (**Invited**)

- Back, J. A., and **R. S. King**. Response of stream macroinvertebrate assemblages to nutrients within the tiered aquatic life use (TALU) framework. Texas River and Reservoir Management Society Meeting, Waco, TX. May 2005.
- Grap, S., **R. S. King**, A. H. Hines, and F. D. Craige. Factors influencing the distribution of blue crabs and bivalves in subestuaries of the Chesapeake Bay, USA. Annual Benthic Ecology Meeting, Groton, CT, March 2003.

**STUDENTS/POSTDOCS  
MENTORED**

Current advisees:

- Matthew Dekar, Ph. D. (Univ. of Arkansas, 2010). Postdoctoral Research Fellow, Baylor University.
- Jason M. Taylor. Ph.D. candidate, Biology, Baylor. Incorporating trophic interactions into biological measures of nutrient enrichment in support of numerical thresholds for aquatic life use attainment in wadeable streams. 2006– . **EPA STAR FELLOW, 2008-2011.**
- Jeffrey A. Back. Ph.D. candidate, Biology, Baylor. Influence of life history traits on macroinvertebrate community response to nutrient enrichment in streams. 2004 – .
- Jesse Ray. Ph. D. student, Ecological, Earth, and Environmental Sciences (EEES). Starting Fall 2010.
- Pamela Kostka. M. S. student, Biology. Starting Fall 2010.
- Daniel Hiatt. Ph. D. student, Biology. Starting Fall 2010.
- Matt James, Chemistry B. S. major, Baylor. Honors thesis: Influence of surface-water phosphorus concentrations on nutrient recycling in periphyton. 2009 –

Past advisees:

- Rebecca S. Shaftel. M.S. Biology, Baylor. Alder dover drives nitrogen availability and decomposition of grass litter in salmon-rearing headwater streams, Kenai Peninsula, Alaska. 2008 – 2010.
- Charles E. Stanley. M. S. Biology, Baylor. Coupling changes in physical habitat and fish community structure between two interannual extremes in stream discharge. 2009
- Katie Zychowski (Biology B.S. major, Baylor). Summer undergraduate research fellow. Does nitrogen and phosphorus enrichment influence breakdown rates of organic matter in small streams of the Kenai Peninsula, Alaska? 2009 – .
- Emily Hooser (Biology B. S. major, Baylor). Summer undergraduate research fellow. Does loss of connectivity caused by dams result in genetic divergence in Texas stream fishes? 2008 (co-mentored with Dr. Patrick Danley).
- Lindsey Jackson (Biology B.S. major, Baylor). 3V90 student. Authored 57 species information sheets and propagated and over 1,000 plants in greenhouse in support of Tri-Beta (biology honor society) Texas native plant sale. 2008.
- Success Sumpaongoen, B. S., Biology, Baylor. Summer undergraduate research fellow. Nutrient recycling in stoneroller minnows. 2007
- Adolfo Flores, B. S., Biology, Baylor. Summer undergraduate research fellow. Carbon, nitrogen, and phosphorus stoichiometry of mayflies. 2007
- Jorges Raudales, B. S., Biology, Baylor. 3V90 student. Macroinvertebrate community composition of central Texas streams. 2007
- David A. Lang. M. S., Biology, Baylor. Effects of nutrient enrichment on

- alkaline phosphatase activity and nitrogen fixation potential in stream periphyton. 2007.
- Nick Harrel, B. S., Biology, Baylor (3V90 student). Spatial pattern of wetland macroinvertebrate community composition along a nutrient gradient. Spring 2005.
- Rebecca Vecere, B.S., Biology, Rutgers University. Smithsonian work/learn intern. Estimation of recent expansion of *Phragmites australis* in marshes of three Chesapeake Bay subestuaries. 2003
- Sarah Grap, B.S., Biology, Coastal Carolina University. Smithsonian REU intern. Factors influencing the distribution of blue crabs and bivalves in subestuaries of the Chesapeake Bay, USA. 2002.
- William Jackson, B. S., Biology, Morgan State University. Smithsonian work/learn intern. Project title: Effects of watershed land use on benthic invertebrate communities in Chesapeake Bay subestuaries. 2002.

Graduate and honors thesis committees, current:

- Jason Berninger, Ph.D. candidate, BMS, Baylor. 2009 – .
- Nick Green, Ph. D. candidate, Biology, Baylor. Mechanisms of boundary responses in small mammal communities. 2008 – .
- Melissa Mullins, Ph. D. student, Biology, Baylor. Ecology of invasive plants in Texas spring-fed rivers. 2006 – .
- Theodore Valenti, Ph. D. student, Biology, Baylor. Effluent toxicity, natural ionic composition of water, and risk assessment. 2007 – .
- Mary Sides, Ph. D. student, Biology, Baylor. *Whither Wood? Woody Vegetation Dynamics in Central Texas and the Associated Carbon Dynamics*. 2007 – .
- Sara Sipahioglu, Ph.D. student, Geology, Baylor. Paleolimnology of lakes in China. 2009 – .

Graduate and honors thesis committees, past:

- Barry Fulton, M. S., Environmental Science. *Influence of N and P concentrations and ratios on Lemna gibba growth responses to triclosan in laboratory and stream mesocosm experiments*. 2009.
- Jon Thomas, M. S. Biology, Baylor. *Assessing Canopy-related Factors Associated with Fire Behavior and Nutrient Cycling*. 2009
- Michelle Nemec. Ph.D. Biology, Baylor. *A systematic comparison of three bacterial source tracking methods for determining the potential sources of fecal contamination in a watershed*. 2008.
- Madelon McCall, Ed.D., Baylor. Evaluation of secondary science education experiences on university biology majors. 2008.
- Emily Hintzen, M. S. Environmental Studies, Baylor. Pesticide toxicity in urban streams. 2007.
- Jacob Stanley. Ph. D., Biology, Baylor. *Considering enantiospecific effects of chiral pharmaceutical contaminants to model aquatic organisms*. 2007.
- Thad Scott. Ph. D., Biology, Baylor. *Periphyton and nutrient dynamics in a freshwater marsh: factors affecting spatial variability in a gradient dominated ecosystem*. 2006.
- Santos Garcia, B. S. Biology (Honors), Baylor. *Use of artificial substrates to assess nutrient impacts on macroinvertebrate communities in Texas streams*. 2006.
- Hui Huang, M. S., Biology, Baylor. *Spatial and temporal patterns of planktonic and community metabolism along the riverine-lacustrine gradient in Texas reservoirs*. 2006.
- Laura Gallant. M.A., Biology, Baylor. Wetland macroinvertebrate ecology. 2006.
- Samir Moussa. M.S., Biology, Baylor. *Determining the potential sources of*

*Escherichia coli* in the South Bosque watershed using antibiotic resistance analysis and carbon utilization profiling. 2005.

Robin Bare. M.A., Biology, Baylor. Aquatic invasive plant ecology. 2005.

Dayo Fadelu. B. S., Biology (Honors), Baylor. *Individual and mixture toxicity of selective serotonin reuptake inhibitors to Vibrio fischeri and Daphnia magna*. 2005.

Non-student and student workers (paid by extramural grants):

Linkun Chen, B.S. Biology major, Work-study student, summer 2009.

Brianna Kirchner. M.S. Student, Biology. Research Assistant, summer 2008.

Justin Grimm. B. S. Biology, Baylor. Research Technician (full-time employee, post-graduation). 2007 – .

Lindsey Boldt. B. S. Biology, Baylor. Work-study student. 2007

Marcy Amaya. B. S. Biology, Baylor. Work-study student. 2007

**STUDENT AWARDS**

U. S. EPA Science to Achieve Results (STAR) Fellowship. Jason M. Taylor. \$111,000. 2008-2010.

Glasscock Endowed Fund for Excellence in Environmental Sciences. Rebecca Shaftel, \$5000. 2009.

Glasscock Endowed Fund for Excellence in Environmental Sciences. Jason M. Taylor, \$5000. 2009.

Baylor Summer Undergraduate Research Fellow. Katie E. Zychowski, \$3000. 2009.

Folmar Research Award. Rebecca Shaftel. \$650 2009.

Bob Gardner Memorial Research Award. Katie E. Zychowski, \$250. 2009

Baylor Summer Undergraduate Research Fellow. Emily Hooser, \$3000. 2008

Baylor University Presidential Scholarship. Rebecca Shaftel. 2008 – .

Bob Gardner Memorial Research Award. Jason M. Taylor. \$1,000. 2008

Folmar Research Award. Jason M. Taylor. \$800. 2008.

Baylor Summer Undergraduate Research Fellow, Success Sumpaongoen, \$3000. 2007

Baylor Summer Undergraduate Research Fellow. Adolfo Flores, \$3000. 2007

Best Oral Presentation (honorable mention), Texas Academy of Sciences Meeting. Jeffrey A. Back. 2007.

Folmar Research Award, David A. Lang, \$1,000. 2006.

Folmar Research Award, Jeffrey A. Back, \$1,000. 2005.

**CHARLES PATRICK HAWKINS**  
CURRICULUM VITAE

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[www.cnr.usu.edu/wmc](http://www.cnr.usu.edu/wmc)

**Education:**

- Ph.D. – Oregon State University. Entomology (Aquatic Ecology emphasis/ Statistics and Philosophy of Science minor). 1982.  
M.A. – California State University, Sacramento. Biology (Aquatic Biology emphasis). 1975.  
B.A. – California State University, Sacramento. Biology (Biochemistry emphasis / Chemistry minor). 1973.

**Positions and Responsibilities:**

- 2003 - Director, Western Center for Monitoring and Assessment of Freshwater Ecosystems, Department of Watershed Sciences, Utah State University.  
1994 - Professor, Department of Watershed Sciences/Ecology Center, Utah State University.  
1990 – 1995 Director, Watershed Science Unit, College of Natural Resources, Utah State University.  
1988 – 1994 Associate Professor, Department of Fisheries and Wildlife, Watershed Science Unit, and Ecology Center, Utah State University.  
1983 – 1988 Assistant Professor, Department of Fisheries and Wildlife, Watershed Science Unit, and Ecology Center, Utah State University.

**Other Recent Significant Responsibilities:**

- 2009 – USEPA Office of Water – Analysis team for National Lakes Assessment.  
2009 – USEPA Science Advisory Board – EPA Report on the Environment Committee.  
2009 – External Review Panel (National Science Foundation), National Center for Earth Surface Dynamics, University of Minnesota.  
2008 – Chair, External Review Panel, Ecological Exposure Research Division, Office of Research and Development, USEPA, Cincinnati, Ohio.  
2007 – 2008 Chair, Local Arrangements Committee, 56<sup>th</sup> Annual Meeting of the North American Benthological Society.  
2006 – USEPA Office of Water – Analysis team for National Wadeable Stream Assessment.  
2001 – 2005 USEPA Science Advisory Board - Ecological Processes and Effects Committee.  
2005 – Community Condition Indicators Committee (H. John Heinz III Center for Science, Economics and the Environment).  
2005 – External Scientific Planning and Review Committee of the California State Water Resources Control Board’s Surface Water Ambient Monitoring Program.

- 2005 – USEPA Office of Water - Indicator Development and Reference Condition Workgroups (National Wadeable Stream Survey, National Rivers Survey, National Lakes Survey).
- 2004 – 2005 Developing stressor-specific indices for diagnoses of the causes of biological impairment in freshwater ecosystems. National Center for Environmental Assessment, US Environmental Protection Agency, Washington, D.C. 2004-2005.

**Areas of Professional Interest and Expertise:**

1. Ecology, conservation, management, and restoration of aquatic ecosystems.
2. Sampling designs and statistical methods applicable to ecological research, monitoring, and conservation.
3. Predictive modeling of community composition.
4. Assessment and monitoring of ecological integrity.
5. Effects of landscape and waterway alteration on the ecological condition of aquatic and riparian ecosystems.
6. Biology and ecology of freshwater invertebrates, amphibians, and fish.

**Society Memberships:**

American Association for the Advancement of Science  
 American Institute of Biological Sciences  
 Ecological Society of America  
 International Ecological Society  
 Society for Conservation Biology  
 North American Benthological Society  
 International Society of Limnology  
 Sigma Xi

**Teaching Experience:**

Introduction to Environmental Studies	Water Pollution and Water Quality
Principles of Watershed Science	Stream Ecology
General Ecology	Riparian Ecology and Management
Graduate Ecology	Watershed Restoration
General Zoology	Publications, Presentations, and Grants in the Life Sciences
Aquatic Entomology	Production Ecology in Aquatic Environments
Freshwater Invertebrate Biology	Resource Competition and Community Structure
Concepts of Ecosystem Management	
Introduction to Aquatic Resources	

**Teaching Awards:**

Graduate Student Mentor of the Year (Fisheries and Wildlife) 1998-1999  
 Graduate Student Mentor of the Year (Aquatic, Watershed, and Earth Resources) 2004-2005

**Research Awards:**

2006 Utah State University, College of Natural Resources – Researcher of the Year

**Publications:***Refereed Journal Articles*

- Creutzburg, B. R., and C. P. Hawkins. 2010. Challenges in developing a predictive and interpretable functional traits model: an assessment based on stream Chironomidae. *Freshwater Biology* (in review).
- Hein, C. L., A. S. Pike, J. F. Blanco, A. P. Covich, F. N. Scatena, C. P. Hawkins, and T. A. Crowl. 2010. Geomorphic barriers structure diadromous faunal communities in tropical island streams. *Ecological Applications* (in review).
- Chinnayakanahalli, K. J., D. G. Tarboton, and C. P. Hawkins. 2010. Characterizing ecologically relevant variation in streamflow regimes. *Freshwater Biology* (in review).
- Pfrender, M. E., C. P. Hawkins, M. Bagley, G. Courtney, B. R. Creutzburg, J. H. Epler, S. Fend, L. C. Ferrington, P. L. Hartzell, S. Jackson, D. P. Larsen, C. A. Levesque, J. C. Morse, M. Petersen, D. Ruiter, D. Schindel, M. Whiting. 2010. Genetic approaches to biodiversity assessment in freshwater ecosystems. *Quarterly Review of Biology* (in revision).
- Hawkins, C. P., Y. Cao, and B. Roper. 2010. Method of predicting reference condition biota affects the performance and interpretation of ecological indices. *Freshwater Biology*. doi:10.1111/j.1365-2427.2009.02357.x (early view).
- Hawkins, C. P., J. R. Olson, and R. A. Hill. 2010. The reference condition: predicting baselines for ecological and water-quality assessments. *Journal of the North American Benthological Society* 29:312-358.
- Hogue, J. N. and C. P. Hawkins. 2008. Notes on the distribution of the mayfly *Caudatella edmundsi* (Allen, 1959) (Ephemeroptera: Ephemerellidae). *Pan-Pacific Entomologist* 84:150-154.
- Hawkins, C. P., S. G. Paulsen, J. Van Sickle, and L. L. Yuan. 2008. Regional assessments of stream ecological condition: scientific challenges associated with the USA's national Wadeable Stream Assessment. *Journal of the North American Benthological Society* 27:808-807.
- Paulsen, S. G., A. Mayo, D. Peck, J. Stoddard, E. Tarquinio, S. Holdsworth, J. Van Sickle, L. L. Yuan, C. P. Hawkins, A. T. Herlihy, P. R. Kaufmann, M. T. Barbour, D. P. Larsen, and A. R. Olsen. 2008. Condition of stream ecosystems in the United States: an overview of the first national assessment. *Journal of the North American Benthological Society* 27:812-821.
- Herlihy, A. T., S. Paulsen, J. Van Sickle, J. Stoddard, C. P. Hawkins, and L. L. Yuan. 2008. Striving for consistency in a national assessment: the challenges of applying a reference condition approach at a continental scale. *Journal of the North American Benthological Society* 27:860-877.
- Yuan, L. L., C. P. Hawkins, and J. Van Sickle. 2008. Effects of regionalization decisions on an O/E index for the national assessment. *Journal of the North American Benthological Society* 27:892-905.

- Carlisle, D. M. and C. P. Hawkins. 2008. Land use and the structure of western USA stream invertebrate assemblages: O/E and ecological traits. *Journal of the North American Benthological Society* 27:986-999.
- Ode, P. R., C. P. Hawkins, and R. D. Mazon. 2008. Comparability of biological assessments derived from predictive models and multimetric indices of increasing geographic scope. *Journal of the North American Benthological Society* 27:967-985.
- Paulsen, S. G., C. P. Hawkins, J. Van Sickle, and L. L. Yuan. 2008. An invitation to apply national survey data to ecological research. *Journal of the North American Benthological Society* 27:1017-1018.
- Creutzburg, B. R. and C. P. Hawkins. 2008. What do J-NABS papers tell us about the current state of knowledge in freshwater benthic science? *Journal of the North American Benthological Society* 27:593-604.
- Carlisle, D. M., C. P. Hawkins, M. R. Meador, M. Potapova, and J. Falcone. 2008. Biological assessments of Appalachian streams derived from predictive models for fish, macroinvertebrate, and diatom assemblages. *Journal of the North American Benthological Society* 27:16-37.
- Cao, Y., C. P. Hawkins, D. Larsen, and J. Van Sickle. 2007. Standardizing sampling effort on autosimilarity for comparing assemblages: effect of species-occurrence and species-abundance distributions. *American Naturalist* 170:381-395.
- Cao, Y., C. P. Hawkins, J. R. Olson, and M. A. Kosterman. 2007. Modeling natural environmental gradients improves the accuracy and precision of diatom-based indicators for Idaho streams. *Journal of the North American Benthological Society* 26:566-585.
- Hargett, E. G., J. R. Zumberge, C. P. Hawkins, and J. R. Olson. 2007. Development of a RIVPACS-type predictive model for bioassessment of Wadeable streams in Wyoming. *Ecological Indicators* 7:807-826.
- Van Sickle, J., D. P. Larsen, and C. P. Hawkins. 2007. Exclusion of rare taxa affects the performance of the O/E index in bioassessments. *Journal of the North American Benthological Society* 26:319-331.
- Rehn, A. C., P. R. Ode, and C. P. Hawkins. 2007. Comparisons of targeted riffle and reach-wide macroinvertebrate samples: implications for data sharing in regional stream condition assessments. *Journal of the North American Benthological Society* 26:332-348.
- Hawkins, C. P. 2006. Maintaining and restoring the ecological integrity of freshwater ecosystems: improving management by refining biological assessments. *Ecological Applications* 16:1249-1250.
- Hawkins, C. P. 2006. Quantifying biological integrity by taxonomic completeness: evaluation of a potential indicator for use in regional- and global-scale assessments. *Ecological Applications* 16:1251-1266.
- Stoddard, J. L., P. Larsen, C. P. Hawkins, R. K. Johnson, and R. H. Norris. 2006. Setting expectations for the ecological condition of running waters: the concept of reference condition. *Ecological Applications* 16:1267-1276.

- de Zwart, D., S. D. Dyer, L. Posthuma, and C. P. Hawkins. 2006. Use of predictive models to attribute potential effects of mixture toxicity and habitat alteration on the biological condition of fish assemblages. *Ecological Applications* 16:1295-1310.
- Van Sickle, J., D. D. Huff., and C. P. Hawkins. 2006. Selecting discriminant function models for predicting the expected richness of aquatic macroinvertebrates. *Freshwater Biology* 51: 359-372.
- Cao, Y., and C. P. Hawkins. 2005. Simulating biological impairment to evaluate the accuracy of ecological indicators. *Journal of Applied Ecology* 42: 954-965.
- Knapp, R. A., C. P. Hawkins, J. Ladau, and J. A. Garton. 2005. Fauna of Yosemite National Park lakes has low resistance but high resilience to fish introductions. *Ecological Applications* 15:835-847.
- Cao, Y., C. P. Hawkins, and A. D. Storey. 2005. A method for measuring the comparability of different sampling methods used in biological surveys: implications for data integration and synthesis. *Freshwater Biology* 50: 1105-1115.
- Van Sickle, J., C. P. Hawkins, D. P. Larsen, A. T. Herlihy. 2005. A null model for the expected macroinvertebrate assemblage in streams. *Journal of the North American Benthological Society* 24:178-191.
- Ostermiller, J. D. and C. P. Hawkins. 2004. Effects of sampling error on bioassessments of stream ecosystems: application to RIVPACS-type models. *Journal of the North American Benthological Society* 23:363-382.
- Vinson, M. R. and C. P. Hawkins 2003. Broad-scale geographic patterns in local stream insect genera richness. *Ecography* 26:751-767.
- Cao, Y., C. P. Hawkins, and M. R. Vinson. 2003. Measuring and controlling data quality in biological assemblage surveys with special reference to stream benthic macroinvertebrates. *Freshwater Biology* 48:1898-1911.
- Norris, R. H. and C. P. Hawkins. 2000. Monitoring river health. *Hydrobiologia* 435:5-17.
- Hawkins, C. P., R. H. Norris, J. N. Hogue, and J. W. Feminella. 2000. Development and evaluation of predictive models for measuring the biological integrity of streams. *Ecological Applications* 10:1456-1477.
- Hawkins, C. P. and R. H. Norris. 2000. Performance of different landscape classifications for aquatic bioassessments: introduction to the series. *Journal of the North American Benthological Society* 19:367-369.
- Hawkins, C. P., R. H. Norris, J. Gerritsen, R. M. Hughes, S. K. Jackson, R. H. Johnson, and R. J. Stevenson. 2000. Evaluation of landscape classifications for biological assessment of freshwater ecosystems: synthesis and recommendations. *Journal of the North American Benthological Society* 19:541-556.

- Hawkins, C. P. and M. R. Vinson. 2000. Weak correspondence between landscape classifications and stream invertebrate assemblages: implications for bioassessments. *Journal of the North American Benthological Society* 19:501-517.
- Carlisle, D. M. and C. P. Hawkins. 1998. Relationship between invertebrate assemblage structure, 2 trout species, and habitat structure in Utah mountain lakes. *Journal of the North American Benthological Society* 17:286-300.
- Converse, Y. K., C. P. Hawkins, and R. A. Valdez. 1998. Habitat relationships of subadult humpback chub in the Colorado River through Grand Canyon: spatial variability and implications of flow regulation. *Regulated Rivers Research and Management* 14:267-284.
- Vinson, M. L. and C. P. Hawkins. 1998. Biodiversity of stream insects: variation at local, basin, and regional spatial scales. *Annual Review of Entomology* 43:271-293.
- Hawkins, C. P., J. N. Hogue, L. A. Decker, and J. W. Feminella. 1997. Channel morphology, water temperature, and assemblage structure of stream insects. *Journal of the North American Benthological Society* 16:728-749.
- Goodwin, C, C. P. Hawkins, and J. L. Kershner. 1997. Riparian restoration in the western United States: overview and perspective. *Restoration Ecology* 5:4-14.
- Hawkins, C. P., K. Bartz, and C. M. U. Neale. 1997. Vulnerability of riparian vegetation to catastrophic flooding: implications for riparian restoration. *Restoration Ecology* 5:75-84.
- Russell, G., C. P. Hawkins, and M. P. O'Neill. 1997. The role of GIS in selecting sites for riparian restoration based on hydrology and land use. *Restoration Ecology* 5:56-68.
- O'Neill, M. P., J. C. Schmidt, J. P. Dobrowolski, C. P. Hawkins, and C. M. U. Neale. 1997. Identifying sites for riparian wetland restoration: a conceptual framework and its application to reaches within the upper Arkansas River basin. *Restoration Ecology* 5:85-102.
- Vinson, M. R., and C. P. Hawkins. 1996. Effects of sampling area and subsampling procedure on comparisons of taxa richness among streams. *Journal of the North American Benthological Society* 15:392-399.
- Feminella, J. W., and C. P. Hawkins. 1995. Interactions between stream herbivores and periphyton: a quantitative analysis of past experiments. *Journal of the North American Benthological Society* 14:465-509.
- Filbert, R. B. and C. P. Hawkins. 1995. Variation in condition of rainbow trout in relation to food, temperature, and individual length in the Green River, Utah. *Transactions of the American Fisheries Society* 124:824-835.
- Feminella, J. W., and C. P. Hawkins. 1994. Tailed frog tadpoles differentially alter their feeding behavior in response to non-visual cues from four predators. *Journal of the North American Benthological Society* 13:310-320.

- Hawkins, C. P., J. L. Kershner, P. Bisson, M. Bryant, L. Decker, S. V. Gregory, D. A. McCullough, K. Overton, G. Reeves, R. Steedman, and M. Young. 1993. A hierarchical approach to classifying stream habitat features. *Fisheries* 18:3-12.
- Lamberti, G. A., S. V. Gregory, C. P. Hawkins, R. C. Wildman, L. R. Ashkenas, and D. M. Denicola. 1992. Plant-herbivore interactions in streams near Mt. St. Helens. *Freshwater Biology* 27:237-247.
- Hogue, J. N., and C. P. Hawkins. 1991. Morphological variation in adult aquatic insects: associations with developmental temperature and seasonal growth patterns. *Journal of the North American Benthological Society*. 10:309-321.
- Hawkins, C. P. and J. R. Sedell. 1991. The role of refugia in the recolonization of streams devastated by the 1980 eruption of Mt. St. Helens. *Northwest Science* 64:271-274.
- Aumen, N. G., C. P. Hawkins, and S. V. Gregory. 1990. Influence of woody debris on nutrient retention in catastrophically disturbed streams. *Hydrobiologia* 190: 183-192.
- Sedell, J. R., G. H. Reeves, F. H. Hauer, J. A. Stanford, and C. P. Hawkins. 1990. Role of refugia in recovery from disturbance: modern fragmented and disconnected river systems. *Environmental Management* 14:711-724.
- Hawkins, C. P. and J. A. MacMahon. 1989. Guilds: the multiple meanings of a concept. *Annual Review of Entomology*. 34:423-451.
- Hawkins, C. P. 1988. Effects of watershed vegetation and disturbance on invertebrate community structure in western Cascade streams: implications for stream ecosystem theory. *Verh. Internat. Verein. Limnol.* 23:1167-1173.
- Hawkins, C. P., L. J. Gottshalk, and S. S. Brown. 1988. Densities of tailed frog tadpoles in small streams following watershed disturbance. *Journal of the North American Benthological Society* 7:246-252.
- Benke, A. C., C. A. S. Hall, C. P. Hawkins, R. H. Lowe-McConnell, J. A. Stanford, K. Suberkropp, and J. V. Ward. 1988. Bioenergetic considerations in the analysis of stream ecosystems. *Journal of the North American Benthological Society* 7:480-502.
- Hawkins, C. P. and J. K. Furnish. 1987. Are snails important competitors in stream ecosystems of the Pacific Northwest (USA). *Oikos* 49:209-220.
- Behmer, D. J. and C. P. Hawkins. 1986. Effects of overhead canopy on macroinvertebrate production in a Utah stream. *Freshwater Biology* 16:287-300.
- Hawkins, C. P. 1986. Variation in individual growth rates and population abundances of ephemereiid mayflies. *Ecology* 67:1384-1395.
- Hawkins, C. P. 1985. Food habits of species of Ephemerellidae (Insecta: Ephemeroptera) in streams of Oregon. *American Midland Naturalist* 113:343-352.

- Harper, F. and C. P. Hawkins. 1984. Description of the imagines of *Ephemerella veruca* Allen and Edmunds (Ephemeroptera, Ephemerellidae). *Aquatic Insects* 6:13-16.
- Hawkins, C. P. 1984. Substrate associations and longitudinal distributions in species of Ephemerellidae (Insecta: Ephemeroptera) from western Oregon. *Freshwater Invertebrate Biology* 3:181-188.
- Hawkins, C. P., M. L. Murphy, N. H. Anderson, and M. A. Wilzbach. 1983. Density of fish and salamanders in relation to riparian canopy and physical habitat in streams of the northwestern United States. *Canadian Journal of Fisheries and Aquatic Sciences* 40:1173-1185.
- Hawkins, C. P., M. L. Murphy, and N. H. Anderson. 1982. Effects of canopy, substrate composition, and gradient on the structure of macro-invertebrate communities in Cascade Range streams of Oregon. *Ecology* 63:1840-1856.
- Hawkins, C. P. and J. R. Sedell. 1981. Longitudinal and seasonal changes in functional organization of macroinvertebrate communities in four Oregon streams. *Ecology* 62:387-397.
- Murphy, M. L., C. P. Hawkins, and N. H. Anderson. 1981. Effects of canopy modification and accumulated sediment on stream communities. *Transactions of the American Fisheries Society* 100:469-478.

#### *Books and Book Chapters*

- Stevenson, R. J., R. C. Bailey, M. C. Harrass, C. P. Hawkins, J. Alba-Tercedor, C. Couch, S. Dyer, F. A. Fulk, J. M. Harrington, C. T. Hunsaker, R. K. Johnson. 2004. Designing data collection for ecological assessments. Pages 55-84 in M. T. Barbour, S. B. Norton, H. R. Preston, and K. W. Thornton (eds), *Ecological Assessment of Aquatic Resources: Linking Science to Decision-Making*. Society of Environmental Toxicology and Chemistry, Pensacola, FL.
- Stevenson, R. J., R. C. Bailey, M. C. Harrass, C. P. Hawkins, J. Alba-Tercedor, C. Couch, S. Dyer, F. A. Fulk, J. M. Harrington, C. T. Hunsaker, R. K. Johnson. 2004. Interpreting results of ecological assessments. Pages 85-101 in M. T. Barbour, S. B. Norton, H. R. Preston, and K. W. Thornton (eds), *Ecological Assessment of Aquatic Resources: Linking Science to Decision-Making*. Society of Environmental Toxicology and Chemistry, Pensacola, FL.
- Bisson, P. A., C. M. Crisafulli, B. R. Fransen, R. E. Lucas, and C. P. Hawkins. 2005. Responses of fish to the 1980 Eruption of Mount St. Helens. Pages 183-198 in V. Dale, F. Swanson, and C. Crisafulli (editors), *Ecological responses to the 1980 eruptions of Mount St. Helens*. Springer-Verlag, New York.
- Crisafulli, C. M., L. S. Trippe, C. P. Hawkins, and J. A. MacMahon. 2005. Amphibian responses to the 1980 eruption of Mount St. Helens. Pages 163-182 in V. Dale, F. Swanson, and C. Crisafulli (editors), *Ecological responses to the 1980 eruptions of Mount St. Helens*. Springer-Verlag, New York.
- Hawkins, C. P. and D. M. Carlisle. 2001. Use of predictive models for assessing the biological integrity of wetlands and other aquatic habitats. Pages 59-83 in R. B. Rader, D. P. Batzer, and S. A. Wissinger (editors) *Bioassessment and management of North American freshwater wetlands*. John Wiley & Sons, New York.

Hawkins, C. P. and R. H. Norris. 2000. Effects of taxonomic resolution and exclusion of taxa on the sensitivity of RIVPACS models used to predict biotic conditions in streams. Pages 217-228 in J. F. Wright, D. W. Sutcliffe, and M. T. Furse (editors). *Assessing the biological quality of freshwaters: RIVPACS and other techniques*. Freshwater Biological Association, Ambleside.

Crisafulli, C. M., and Hawkins, C. P. 1997. Ecosystem recovery following a catastrophic disturbance: lessons learned from Mount St. Helens, in Mack, M., P. Opler, C. Haecker, P. Doran and L. Huckably (editors.). *Status and trends of the nation's biological resources*. USDI, Washington D.C.

Hawkins, C. P. 1990. Relationship between habitat dynamics, food availability, and growth patterns of ephemereid mayflies from western North America. Pages 35-42 in I. Campbell (editor.), *Mayflies and stoneflies: biology and life histories*. Kluwer Academic Publishers.

Baker, A. D. and C. P. Hawkins. 1990. Patch specific differences in drift of *Baetis*. Pages 269-274 in I. Campbell (ed.), *Mayflies and stoneflies: biology and life histories*. Kluwer Academic Publishers.

#### *Published Symposia*

Hawkins, C. P. 1994. What are riparian ecosystems and why are we worried about them? *Natural Resources and Environmental Issues* 1:1-10.

Hawkins, C. P., J. Dobrowolski, J. J. McDonnell, and M. O'Neill. 1992. Interdisciplinary education in Watershed Science: a natural resources perspective. Pages 249-254 In JA Rayal (ed.), *Hydrology and Water Resources Education, Training, and Management*. Water Resources Publications, Littleton, Colorado. Symposium on Hydrology and Water Resources Education and Training: the Challenges to Meet at the Turn of the Century. Chihuahua, Mexico.

#### *Commentaries and Book Reviews*

Hawkins, C. P. 1996. Book review. *Current directions in research on Ephemeroptera* by L.D. Corkum and J.J.H. Ciborowski. *Journal of the North American Benthological Society* 15:136-138.

Hawkins, C. P. 1986. Pseudo-understanding of pseudoreplication. *Bulletin of the Ecological Society of America* 67:184-185.

#### *Major Technical Reports*

Paulsen, S, and others. 2006. *Wadeable Streams Assessment: a Collaborative Survey of the Nation's Streams*. United States Environmental Protection Agency Office of Water, Washington, DC. EPA 841-B-06-002 (collaborator and contributor).

Stoddard JL, DV Peck, AR Olsen, DP Larsen, J Van Sickle, CP Hawkins CP, RM Hughes, TR Whittier, G Lomnický, AT Herlihy, PR Kaufmann, SA Peterson, PL Ringold, SG Paulsen, R Blair. 2005. *Environmental Monitoring and Assessment Program (EMAP). Western Streams and Rivers Statistical Summary*. United States Environmental Protection Agency, Office of Research and Development. EPA 620/R-05/006.

Dickson, K. L., G. A. Burton, D. Grothe, and C. P. Hawkins. 1997. Technical expert panel report - EPA 305(b) aquatic life use support (ALUS) workshop - Washington, D.C., August 12-14, 1997. 18 pp.

Hawkins, C. P. and five others. 1994. Cumulative watershed effects: an extensive analysis of responses by stream biota to watershed management. Final Report to USDA Forest Service, Region 5 (California).

Wurtsbaugh, W. and C. P. Hawkins. 1990. Trophic interactions between fish and invertebrates in Bear Lake, Utah-Idaho. Final Report to the Utah Division of Wildlife Resources. 167 pp.

#### **Major Editorial Responsibilities:**

Hawkins, C. P., S. G. Paulsen, J. Van Sickle, and L. L. Yuan (editors). 2008. Regional assessments of stream ecological condition. *Journal of the North American Benthological Society*, 27(3).

Hawkins, C. P. and R. H. Norris (editors). 2000. Landscape classifications: aquatic biota and bioassessments. *Journal of the North American Benthological Society* 19 (3).

Associate Editor (Community Ecology and Applied Ecology): *Journal of the North American Benthological Society* (1993 - 1996).

Associate Editor (Community Ecology): *Journal of the North American Benthological Society* (1987 - 1989).

#### **Extramural Funding:**

2009 U.S. Environmental Protection Agency. - \$789,533. Consequences of Global Climate Change for Stream Biodiversity and Implications for the Application and Interpretation of Biological Indicators of Aquatic Ecosystem Condition.

2007. Colorado Department of Public Health and Environment. - \$47,812. Development of a Fish Multivariate Predictive Model for the State of Colorado.

2007. U.S. Geological Survey. - \$89,975. Establishing a National Reference Site Clearinghouse (NRSC): a Public Database Containing the Biological Data Needed to Conduct Biological Assessments of Freshwater Ecosystems in the United States.

2005 U.S. Environmental Protection Agency. - \$234,999. Evaluation of Reference Site Classification Schemes, Probability-based Survey Designs, Biological Indicators, Biotic Tolerance Values, and the Comparability of Different Sampling Methods for Lakes and Ponds.

2005. TetraTech, Corp. - \$22,000. Ecological Data Application System (EDAS) Enhancement and Multimetrix/Multivariate Development.

2005. Idaho Department of Environmental Quality. - \$41,429. Developing and Validating a Periphyton Bioassessment Tool for Wadeable Streams in Idaho.

2005. Utah Department of Environmental Quality. - \$41,700. Building Tools to Interpret Biological Data in Utah.
2005. U. S. Environmental Protection Agency. - \$146,510. Refining Bioassessment Tools and Biocriteria for Western States.
2005. U. S. Environmental Protection Agency. - \$251,583. Evaluation of Reference Site Classification Schemes, Probability-based Survey Designs, Biological Indicators, Biotic Tolerance Values, and the Comparability of Different Sampling Methods for Western Lakes and Ponds.
2005. U. S. Environmental Protection Agency. - \$42,980. Critical Review of the State-of-the-Science of Bioassessment Comparability.
2005. U. S. Environmental Protection Agency. - \$794,200. Congressional Funding in support of the Western Center for Monitoring and Assessment of Freshwater Ecosystems
2004. U. S. Environmental Protection Agency. - \$298,000. Congressional Funding in support of the Western Center for Monitoring and Assessment of Freshwater Ecosystems.
- 2003 U. S. Environmental Protection Agency. - \$883,515. Testing watershed classifications relevant to bioassessment, conservation planning, and watershed restoration.
- 2003 U. S. Environmental Protection Agency. \$100,000. Establishment of the Western Regional Center for Biological Monitoring and Assessment of Freshwater Ecosystems: initial tasks and deliverables.
- 2001 U. S. Environmental Protection Agency - \$1,499,691. An empirical evaluation of the performance of different approaches to classifying reference conditions in streams.
- 2000 U.S. Forest Service: \$52,000. Habitat associations and spatial distribution of the Larch Mountain salamander.
- 2000 U.S. Forest Service: \$48,704. Development and testing of a procedure for conducting integrated riparian corridor assessments: phase 1 - data needs, identification of collaborators, and design of field work.
- 2000 U.S. Forest Service: \$97,735. Assessing effects of watershed and stream alteration on the biological integrity of streams in eastern Oregon and Washington.
- 2000 Utah State University: \$18,000. Development of Predictive Models for Assessing the Biological Condition of Utah Streams and Rivers.
- 1998 U.S. Environmental Protection Agency: \$325,999. Comparison of the behavior and performance of alternative methods of biological assessment for streams.
- 1998 U.S. Forest Service: \$126,591. Development and testing of a procedure for providing quantitative, consistent, and interpretable measures of the effects of forest management on the ecological integrity of streams.

- 1995 U.S. National Science Foundation: \$20,000. Initial response of stream biota to catastrophic flooding: interaction between flood magnitude, watershed physiography, and landscape alteration.
- 1994 U.S. Forest Service, Wilderness Institute: \$15,117. One year seed grant to conduct a literature review on the effects of livestock grazing on aquatic and riparian ecosystems within wilderness of the western United States.
- 1993 U.S. Forest Service, Wilderness Institute: \$11,000. Effects of exotic fish introductions in Uinta Mountain Lakes.
- 1992 U.S. Environmental Protection Agency: \$118,000. Selecting priority sites for riparian wetland restoration: a case study in the San Luis Rey Watershed.
- 1992 U.S. Environmental Protection Agency: \$150,124. Selecting priority sites for riparian wetland restoration: a case study in the Upper Arkansas River, Colorado (co-principal investigator).
- 1992 U.S. Forest Service: \$27,000. Long-term response of stream biota to catastrophic watershed disturbance.
- 1992 U.S. Forest Service: \$21,000. Evaluation of videography as a habitat monitoring tool.
- 1992 U.S. Forest Service: \$55,000. The influence of habitat complexity on trout population dynamics.
- 1988 U.S. Forest Service: \$479,546. Cumulative watershed effects: an empirical evaluation of the response by stream biota to forest management.
- 1987 Utah Division of Wildlife Resources: \$38,905. Trophic interactions between fish and invertebrates in Bear Lake, Utah-Idaho: Phase II (co-principal investigator).
- 1987 U.S. Forest Service: \$32,235. Response of stream biota to cumulative watershed perturbation.
- 1987 U.S. Forest Service: \$61,392. Determining temporal and spatial effects of watershed disturbance on stream biota: a pilot study.
- 1986 Utah Division of Wildlife Resources: \$54,100. Trophic interactions between fish and invertebrates in Bear Lake, Utah-Idaho: implications for management (co-principal investigator).
- 1986 U.S. Forest Service: \$9,321. Development of a study plan to test the relationships between habitat units, stream dynamics, and stream communities.
- 1985 National Science Foundation: \$250,000. Succession in a stream ecosystem following catastrophic disturbance.
- 1984 Utah State University: \$7,940. Geographic variation in growth size of aquatic poikilotherms.
- 1983 National Science Foundation: \$90,771. Regulation of community structure and trophic dynamics in stream ecosystems by a snail (co-principal investigator).

- 1981 National Science Foundation: \$1,100,000. Role of riparian vegetation in the metabolism and structure of stream ecosystems (co-principal investigator).
- 1981 USDA Cooperative Research: \$44,042. Recovery of biological and habitat integrity in aquatic ecosystems surrounding Mt. St. Helens (Awarded to major professor).
- 1980 U.S. Forest Service: \$50,012. Establishment of permanent benchmark stream ecosystem and fish habitat research sites around Mt. St. Helens (Awarded to major professor).
- 1978 U.S. Environmental Protection Agency: \$72,000. Effects of sediment-trophic interactions on stream communities (Awarded to major professor).
- 1977 National Science Foundation Doctoral Improvement Grant: \$5,630. The response of the genus *Ephemereilla* to changes in food quality and quantity in a stream ecosystem.

**Other Significant Experience and Responsibilities:**

*Technical Advice to Agencies*

Chair, External Review Panel, Ecological Exposure Research Division, National Exposure Research Laboratory, Office of Research and Development, U.S. Environmental Protection Agency, Cincinnati, Ohio. April 2008

Member, External Scientific Planning and Review Committee of the California State Water Resources Control Board's Surface Water Ambient Monitoring Program. October 2005.

Invited Participant: Establishing reference conditions for streams and rivers in the western United States. USEPA, Phoenix, AZ, February, 2001.

Invited Participant: Pellston Workshop - Ecological Assessment of Aquatic Resources: Application, Implementation, and Communication. Society of Environmental Toxicology and Chemistry, Pellston, Michigan, September 2000.

Invited Participant: US EPA sponsored workshop on Predicting the Effects of Climate Change on Aquatic Ecosystems of the Great Basin and Rocky Mountains. U.S. Environmental Protection Agency, Salt Lake City, Utah, March, 2000.

Technical Expert: Workshop on application of predictive models in bioassessment of water quality. California Department of Fish and Game, Sacramento, California, September 1999.

Technical Expert Panel: Large Rivers Science Advisors Workgroup. US EPA, Office of Water. Baltimore, Maryland, 1-3 April 1998.

Instructor: U.S. Forest Service Continuing Education Short Courses. Modules on the theory and practice of stream ecosystem monitoring. 1993 -2000.

Technical Advisor: Biological Data Analysis Workshop. US EPA Regions 8 and 10. Boise, Idaho. 29-30 January 1998.

Technical Expert Panel: Provide peer review of US EPA draft document revising Guidelines on Making Use Support Decisions for Aquatic Life (section 305(b) of the Clean Water Act ). 12 - 14 August 1997.

Science Panelist: Provide technical guidance at US EPA workshop on Stream Corridor and Wetland Restoration. 19 - 21 August 1997.

Panelist: (1995, 1996, 1997): Joint EPA and NSF sponsored research competition on Water and Watersheds.

Invited Participant: International workshop on the biological assessment of ecological quality of rivers. Institute of Freshwater Ecology, Natural Environmental Research Council, United Kingdom, Jesus College, Oxford, 16 - 18 September 1997.

Invited Participant: Workshop on use of aquatic invertebrates in bioassessment of water quality in California. California Department of Fish and Game, Sacramento, California, 26 September 1994.

Member: U.S. Environmental Protection Agency Scientific Advisory Board Subcommittee on Biological Criteria (1993). Provide advice to EPA regarding the reliability of using biological criteria for detecting and monitoring water quality.

Invited Participant: US EPA sponsored workshop on Selection of Indicators to Monitor Stream Ecosystem Health. U.S. Environmental Protection Agency, Cincinnati, Ohio, 26-28 February, 1992.

Invited Participant: Workshop on Cumulative Impact Assessment organized by the Ontario Ministry of Natural Resources, Toronto, Canada, 4 December, 1992.

Invited Participant: US EPA sponsored workshop on Predicting the Effects of Climate Change on Desert Ecosystems. U.S. Environmental Protection Agency, Logan, Utah, 15-17 September, 1991.

Invited Participant: US EPA sponsored workshop on Strategies for Restoring Riparian Wetlands. U.S. Environmental Protection Agency, Denver, Colorado, 25-26 July, 1991.

Invited Member: Committee to review of the U.S. Forest Service aquatic ecosystem analysis program. USDA. Forest Service, Lakewood, Colorado, 3-4 December, 1990.

Invited Participant: US EPA sponsored workshop on Selection of Indicators to Monitor Riparian Ecosystem Health. U.S. Environmental Protection Agency, Las Vegas, Nevada, 25-27 September, 1990.

Invited Participant: US EPA sponsored symposium on Lotic Ecosystem Recovery held at Duluth, Minnesota, Oct 3-6, 1988.

Invited Participant: International workshop on Factors Controlling Community Structure and Function in Tropical Versus Temperate Streams sponsored by the U.S. National Science Foundation, Flathead Lake Biological Station, University of Montana, 24-28 April 1987.

Member: Executive Committee, North American Benthological Society (1988 - 1989). Consider society business brought forth at the annual meeting and advise the president of the society.

Member: Nominations Committee for the North American Benthological Society (1986).

#### *Society Leadership*

Chair, Local Arrangements Committee, 2008 Annual Meeting of the North American Benthological Society

Chair: Aquatic Ecology Section, Ecological Society of America (1989 - 1990). Plan, schedule, and conduct the Section's annual business meeting and represent the Section's interest in the ESA Council, which governs the society.

Program Committee: Ecological Society of America, (1989 - 1990).

Vice Chair: Aquatic Ecology Section, Ecological Society of America (1987 and 1988). Represent the Section on the Program Committee for the society's annual meeting. Stand in for the Chair in his/her absence.

Program Chairman: 1985 Annual Meeting of the North American Benthological Society.

#### *Sabbatical Studies*

Developing stressor-specific indices for diagnoses of the causes of biological impairment. National Center for Environmental Assessment, US Environmental Protection Agency, Washington, D.C. 2004-2005.

Evaluation of multivariate and multimetric approaches for assessing stream biological water quality. Cooperative Research Centre for Freshwater Ecology, University of Canberra, Canberra, Australian National Territory, January 1996-1997.

Stream Ecology, Department of Zoology, University of Otago, Dunedin, New Zealand, 1989-1990.

#### *Ad Hoc Referee for the Following Professional Journals*

American Naturalist	Hydrobiologia
Archive für Hydrobiologia	Journal of the American Water Resources Association
Canadian Journal of Fisheries and Aquatic Sciences	Journal of Environmental Management
Conservation Biology	Journal of Freshwater Ecology
Copeia	Journal of Insect Behavior
Ecology	Journal of the Kansas Entomology Society
Ecological Applications	Journal of the North American Benthological Society
Ecological Monographs	Limnology and Oceanography
Environmental Management	Nature
Freshwater Biology	
Freshwater Invertebrate Biology	

North American Journal of Fisheries  
Management  
Oecologia  
Oikos

Regulated Rivers Research and Management  
Transactions of the American Fisheries Society  
Science

*Ad Hoc Referee for over 200 grant proposals submitted to:*

National Science Foundation  
USEPA Competitive Grants  
USEPA Regional Programs  
USDA Competitive Grants  
USGS Water Resources  
Nature Conservancy  
Australian Research Council  
Canadian Research Council

**Personal Interests:**

Gardening, Cooking, Squash (the racquet game), Various Other Sports, Folk/Americana/Celtic Music, Current Events, Politics.

## Curriculum Vitae - David G. Tarboton

March 2010

Professor, Utah Water Research Laboratory and Department of Civil and Environmental Engineering, Utah State University. Adjunct Professor in Watershed Sciences and Geology departments.

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### Education:

Sc.D., Civil Engineering (Water Resources and Hydrology), Massachusetts Institute of Technology, September 1989, Dissertation: The analysis of river basins and channel networks using digital terrain data, Advisor: Rafael Bras.  
M.S., Civil Engineering, Massachusetts Institute of Technology, May 1987, Thesis: Hydrologic sampling: A characterization in terms of rainfall and basin properties, Advisor: Rafael Bras.  
Diploma in Datametrics, (Computer Science), University of South Africa, December 1984.  
B.Sc Eng, Civil Engineering, University of Natal, Durban, South Africa, December 1981.

### Experience:

February 1990 to Present, Assistant to Associate to Full Professor, Utah Water Research Laboratory and Department of Civil and Environmental Engineering, Utah State University.  
November 1997 to June 1998, Visiting scientist at the National Institute for Water and Atmospheric Research, Christchurch, New Zealand, while on sabbatical leave from Utah State University.

**Selected Refereed Publications** (from over 50 refereed. Many available online at <http://www.engineering.usu.edu/dtarb/>)

Luce, C. H. and D. G. Tarboton, (2010), "Evaluation of alternative formulae for calculation of surface temperature in snowmelt models using frequency analysis of temperature observations," *Hydrol. Earth Syst. Sci.*, 14(3): 535-543, <http://www.hydrol-earth-syst-sci.net/14/535/2010/>.

Tesfa, T. K., D. G. Tarboton, D. G. Chandler and J. P. McNamara, (2009), "Modeling Soil Depth based upon Topographic and Land Cover Attributes," *Water Resour. Res.*, 45: W10438, <http://dx.doi.org/10.1029/2008WR007474>.

Tarboton, D. G., J. S. Horsburgh, D. R. Maidment, T. Whiteaker, I. Zaslavsky, M. Piasecki, J. Goodall, D. Valentine and T. Whitenack, (2009), "Development of a Community Hydrologic Information System," *18th World IMACS Congress and MODSIM09 International Congress on Modelling and Simulation*, ed. R. S. Anderssen, R. D. Braddock and L. T. H. Newham, Modelling and Simulation Society of Australia and New Zealand and International Association for Mathematics and Computers in Simulation, July 2009, p.988-994, [http://www.mssanz.org.au/modsim09/C4/tarboton\\_C4.pdf](http://www.mssanz.org.au/modsim09/C4/tarboton_C4.pdf).

Tarboton, D. G., K. A. T. Schreuders, D. W. Watson and M. E. Baker, (2009), "Generalized terrain-based flow analysis of digital elevation models," *18th World IMACS Congress and*

- MODSIM09 International Congress on Modelling and Simulation, ed. R. S. Anderssen, R. D. Braddock and L. T. H. Newham, Modelling and Simulation Society of Australia and New Zealand and International Association for Mathematics and Computers in Simulation, July 2009, p.2000-2006, [http://www.mssanz.org.au/modsim09/F4/tarboton\\_F4.pdf](http://www.mssanz.org.au/modsim09/F4/tarboton_F4.pdf).
- Tesfa, T. K., D. G. Tarboton, D. G. Chandler and J. P. McNamara, (2009), "Modeling Soil Depth based upon Topographic and Land Cover Attributes," *Water Resour. Res.*, 45: W10438, <http://dx.doi.org/10.1029/2008WR007474>.
- Horsburgh, J. S., D. G. Tarboton, M. Piasecki, D. R. Maidment, I. Zaslavsky, D. Valentine and T. Whitenack, (2009), "An integrated system for publishing environmental observations data," *Environmental Modelling & Software*, 24(8): 879-888, <http://dx.doi.org/10.1016/j.envsoft.2009.01.002>.
- Tarboton, D. G. and M. E. Baker, (2008), "Towards an Algebra for Terrain-Based Flow Analysis," in Representing, Modeling and Visualizing the Natural Environment: Innovations in GIS 13, Edited by N. J. Mount, G. L. Harvey, P. Aplin and G. Priestnall, CRC Press, Florida.
- Horsburgh, J. S., D. G. Tarboton, D. R. Maidment and I. Zaslavsky, (2008), "A Relational Model for Environmental and Water Resources Data," *Water Resour. Res.*, 44: W05406, doi:10.1029/2007WR006392.
- Tarolli, P. and D. G. Tarboton, (2006), "A new method for determination of most likely landslide initiation points and the evaluation of digital terrain model scale in terrain stability mapping," *Hydrol. Earth Syst. Sci.*, 10: 663-677, [www.hydrol-earth-syst-sci.net/10/663/2006/](http://www.hydrol-earth-syst-sci.net/10/663/2006/)
- Bandaragoda, C., D. G. Tarboton and R. Woods, (2004), "Application of Topnet in the Distributed Model Intercomparison Project," *Journal of Hydrology*, 298: 178-201, doi:10.1016/j.jhydrol.2004.03.038.
- Luce, C. H. and D. G. Tarboton, (2004), "The Application of Depletion Curves for Parameterization of Subgrid Variability of Snow," *Hydrological Processes*, 18: 1409-1422, DOI: 10.1002/hyp.1420.

### **Activities.**

Developed and support the following software that is freely available on my web site (<http://www.engineering.usu.edu/dtarb/>)

- UEB. The Utah Energy Balance Snowmelt model.
- TARDEM, TauDEM. Programs for terrain analysis and watershed delineation.
- SINMAP. An Arcview Extension for terrain stability mapping.

Member of WATER and Environmental Systems Research (WATERS) Network design for writing of Science, Education, and Design Strategy for the WATER and Environmental Research Systems Network (SEDS <http://www.watersnet.org/>), 2007-2009.

Member of Unidata Policy Committee, 2006 – 2011.

Member of National Research Council Committee on Water Resources Activities at the U.S. Geological Survey, 2006 – 2008.

Peer Reviewer for US Army Corps of Engineers Louisiana Coastal Protection and Restoration (LACPR) preliminary technical report (PTR), <http://lacpr.usace.army.mil/>, 2006.

Consortium of Universities for the Advancement of Hydrologic Science, Inc. (CUAHSI), Elected member of Board of Directors, 2005-2007.

# **RESUME OF EDUCATION, EXPERIENCE, EMPLOYMENT, AND PUBLICATIONS**

for

J. Wallace Gwynn, Ph.D., P.G.  
Salines Geologist

January 20, 2011

## **PERSONAL**

Home address: 1885 South 50 West, Bountiful, Utah 84010 (USA)

Telephone No.: Home (801) 292-1670, Cell (801) 510-4294, e-mail g9434@msn.com

Date of Birth: May 30, 1940

Married to Carol Gwynn, parents of five children.

Citizenship: USA

## **EDUCATION**

University of Utah, (1958-1965), BS Mineralogy/Geology

University of Utah, (1965-1970), PhD Mineralogy/Allied Fields

Ph.D. Dissertation: "Instrumental Analysis of Tars and Their Correlations in Oil-Impregnated Sandstone Beds, Uintah and Grand Counties, Utah (USA)

Scholarship: NASA Traineeship (1969-1970)

## **PATENT**

U.S. PATENT NO. 3,953,572 - Removal of boron from MgCl<sub>2</sub> brines: invented by R.K. Darlington, J.W. Gwynn, and S.H. Hall.

## **PROFESSIONAL LICENSE**

Professional Geologist, License No. 5529777-2250 (Active)

## **EMPLOYMENT**

**Utah Geological Survey** (June 16, 1975 to retirement on November 16, 2009)

P.O. Box 146100, Salt Lake City, UT 84114-6100

Duties included: Foster the responsible exploration, development, utilization and management of Utah's mineral and energy resources through the gathering, compilation, analysis and dissemination of current, reliable, and relevant information.

Most recently served as a Research Geologist specializing in saline deposits and industrial minerals within the State of Utah.

Served as head of the Minerals Section, supervised the work of four, full-time professional geologists in the fields of metallics, industrial minerals, uranium, and salines.

Managed the UGS-BLM cooperative Computer Resource Information Bank (CRIB) program.

Served as project manager of a UGS-U.S. Department of Energy (DOE) cooperative low-temperature geothermal assessment program.

Served on the Great Salt Lake Technical Team, and the Bonneville Salt Flats Technical Review Committee. Contributed to the writing and editing of the "1995-Great Salt Lake Comprehensive Management Plan - planning Process and Matrix," and to the 2000 Great Salt Lake Comprehensive Management Plan (Resource and Decision Documents). Most recently, served on the Great Salt Lake Minerals Interagency Taskforce.

Served on several thesis committees, gave talks and poster sessions, answered public inquiries, mentor science fair participants, and judge at school and district science fairs.

**Great Salt Lake Minerals Corporation** (March 1975-June 1975)

P.O. Box 1190, Ogden, UT 84402

Duties: Analyze, summarize, and interpret brine and salt chemical data related to the extraction of potassium sulfate and other industrial minerals from the brines of the Great Salt Lake.

**N.L. Industries**, now U.S. Magnesium (December 1971-February 1975)

238 North 2200 West, Salt Lake City, UT 84116

Duties: Plan, conduct, and report independent and assigned laboratory and pilot-plant research related to all phases of the extraction of magnesium metal and chlorine gas from the waters of the Great Salt Lake. Conducted pilot plant studies.

**Phelps Dodge Corporation** (June 1970-December 1971)

140 West 2950 South, Salt Lake City, UT

Duties: Participate in independent and supervised geological reconnaissance and geochemical sampling programs. Evaluated and recommended follow-up action, conduct property evaluations.

## **PUBLICATIONS**

Gwynn, J.W., and Cohenour, R.E., 1966, Oil-shale appraisal of lands in sections 2 and 32, T. IDS., R.25E., SLM, Uintah County, Utah (The Raven Dome and Hell Hole Claims): Utah Geological and Mineral Survey, f.c. UGMS Report of Investigation 26.

Gwynn, J.W., 1970, Instrumental analysis of tars and their correlations in oil-impregnated sandstone beds, Uintah and Grand counties, Utah: University of, Utah (Thesis Ph.D.), Salt Lake City, Utah.

Gwynn, J.W., 1971, Instrumental analysis of tars and their correlations in oil-impregnated sandstone beds, Uintah and Grand Counties, Utah: Utah Geological and Mineral Survey Special Studies, no. 27, 64p.

Mauger, R.L, Kayser, R.B., and Gwynn, J.W., 1973, A sulfur isotopic study of Uinta basin hydrocarbons: Utah Geological and Mineral Survey Special Studies, no. 41,17p.

Gwynn, J.W., 1977, An evaluation of the effect of proposed lake level and salinity controls on the brines of Great Salt Lake, Utah: Utah Geology, v. 4, no. 2, p. 85-93.

Gwynn, J.W., 1977, Reanalysis of UGMS quarterly brine samples by Great Salt Lake Minerals and Chemicals Corporation: Utah Geological and Mineral Survey, Report of Investigation 114, 12 p.

Gwynn, J.W., 1977, A preliminary investigation into the electrochemical potential of the Great Salt Lake, Utah: Utah Geological and Mineral Survey Report of Investigation 115,8p.

Gwynn, J.W., 1977, Great Salt Lake south arm deep-shallow brine interface study: Utah Geological and Mineral Survey, Report of Investigation 116, 27 p.

Gwynn, J.W., and Sturm, P.A., 1977, Approximation of magnesium concentration by refractive index measurements in evaporating brines of Great Salt Lake, Utah: Utah Geology, v. 4, no. 1, p. 43-48.

Gwynn, J.W., 1978, Great Salt Lake study of surface currents: Utah Geological and Mineral Survey Notes, v. 12, no. 3.

Murphy, P.J., and Gwynn, J.W., 1979, Geothermal investigations at Crystal Hot Springs, Salt Lake County, Utah: Utah Geological and Mineral Survey Report of Investigation no. 139, 86 p.

Murphy, P.J., and Gwynn, J.W., 1979, Geothermal investigations of the Warm Springs Fault geothermal system, Salt Lake County, Utah: Utah Geological and Mineral Survey Report

of Investigation no. 140, 29 p.

Murphy, P.J., and Gwynn, J.W., 1979, Geothermal investigations at selected thermal systems of the northern Wasatch Front, Weber and Box Elder Counties, Utah: Utah Geological and Mineral Survey Report of Investigation no. 141, 50 p.

Gwynn, J.W., editor, 1980, Great Salt Lake, a scientific, historical and economic overview: Utah Geological and Mineral Survey Bulletin 116, 400 p. (A collection of 36 articles, of which three were authored or co-authored by Gwynn)

Gwynn, J.W., and Murphy, P.J., 1980, Recent sediments of the Great Salt Lake: in Gwynn, J.W., editor, Great Salt Lake, a Scientific, Historical and Economic Overview: Utah Geological and Mineral Survey, Bulletin 116, p. 83-96.

Doelling, H.H., Campbell, J.A., Gwynn, J.W., and Perry, L.I., 1980, Geology and mineral resources of Box Elder County, Utah: Utah Geological and Mineral Survey Bulletin 115, 251 p.

Klauck, R.H., Darling, R., Davis, D.R., Gwynn, J.W., and Murphy, P.J., 1981, Progress report on the geothermal assessment of the Jordan Valley, Salt Lake County, Utah: Utah Geological and Mineral Survey, 22 p.

Gwynn, J.W., 1982, Identification and discussion of AMAX solar pond harvest salts, Great Salt Lake, Utah: Utah Geological and Mineral Survey Report of Investigation no. 171, 26 p.

Gwynn, J.W., 1984, The Great Salt Lake incremental sampling program: Utah Geological and Mineral Survey, Survey Notes, v. 18, no. 1.

Gwynn, J.W., 1984, Mining conditions and problems encountered within the Texasgulf- Cane Creek Potash Mine near Moab, Utah: and potential mining conditions at Gibson Dome, Utah: Utah Geological and Mineral Survey, R.I. no. 184, 12 p.

Gwynn, J.W., 1985, Computerized index for bibliography of Utah geology: Utah Geological and Mineral Survey.

Gwynn, J.W., 1985, The Hill Creek oil-impregnated sandstone deposit: Utah Geological and Mineral Survey Report of Investigation no. 201, 39 p.

Gwynn, J.W., Clem, Keith, Shubat, Mike, Tripp, Bryce, and Sturm, P.A., 1985, Mineral occurrences in the emergency withdrawal area and adjacent lands in the Great Salt Lake Desert, Utah Geological and Mineral Survey Report of Investigation no. 200, 39 p.

Gwynn, J.W., 1986, Overburden map and thickness determinations, Sunnyside oil- impregnated sandstone deposit, Carbon and Duchesne Counties, Utah: Utah Geological and Mineral Survey Report of Investigation no. 210, 10 p.

Gwynn, J.W., 1986, An approximation of the physical and chemical characteristics of

Farmington Bay and Bear River Bay, Great Salt Lake, Utah: Utah Geological and Mineral Survey Report of Investigation no. 211, 22 p.

Gwynn, J.W., 1987, Effects of breaching the Southern Pacific Railroad causeway, Great Salt Lake, Utah-physical and chemical changes, August 1, 1984-July, 1986: Utah Geological and Mineral Survey Water-Resources Bulletin 25, 25 p.

Gwynn, J.W., 1987, Physical, chemical, and economic aspects of the Great Salt Lake, Utah: in Kopp, R.S., and Cohenour, R.E., editors, Cenozoic Geology of Western , Utah - sites for precious metal and hydrocarbon accumulations: Utah Geological Association Publication 16, p. 165-179.

Gwynn, J.W., 1987, National Science Teachers Association Great Salt Lake field trip: Geological and Mineral Survey Open-File Report 112, 6 p.

Gwynn, J.W., 1989, Great Salt Lake brine sampling program, 1985-1987: Utah Geological & Mineral Survey Open-File Report 117, 30 p.

Gwynn, J.W., 1989, The saline resources of Utah: Survey Notes, v. 23, no. 3, p. 21-31.

Gwynn, J.W., 1990, Assessment and development of saline resources of Sevier Lake, Millard County, Utah, in Allison, M.L., editor, Energy and Mineral Resources of Utah; Utah Geological Association Publication 18, p. 125-134.

Gwynn, J.W., and Tripp, B.T., 1990, Mineral and Energy Resources; in W.R. Lund, editor, Engineering geology of the Salt Lake City Metropolitan area, Utah, Utah Geological and Mineral Survey Bulletin 126, p. 48-53.

Gwynn, J.W., 1992, Saline waters of the Paradox basin area, southeastern Utah: their chemical character and distribution (abstract): (USGS) Workshop on Pennsylvanian and Permian sedimentary rocks of the Paradox Basin, September 17-18, Denver, Colorado.

Gwynn, J.W., 1992, The oil well saline-water resources of the Uinta Basin, Utah: their character and distribution; in Fouch, T.D., Nuccio, V.F., and Chidsey, T.C., Jr., editors, 1992, Hydrocarbon and Mineral Resources of the Uinta Basin, Utah and Colorado: Utah Geological Association Guidebook 20, p. 289-308.

Waddell, K.M., Gwynn, J.W., Burden, Carol, and Wold, S.R., 1992, Salt budget for West Pond, Utah, April 1987 to April 1988: U.S. Geological Survey Water- Resources Investigations Report 91-4117, 29 p.

Gwynn, J.W., 1995, Factors affecting the formation and rate of calcium carbonate scaling: in Morgan, C.D., compiler, Second annual report- increased oil production and reserves from improved completion techniques in the bluebell field, Uinta Basin, Utah: Utah Geological Survey Open-File Report 330, p. 90-107.

Gwynn, J.W., 1995, Resistivities and chemical analyses of selected oil and gas field, water well, and spring waters, Utah: Utah Geological Survey Circular 87, 1142 p.

- Gwynn, J.W., 1996, History of potash production from the Salduro Salt Marsh (Bonneville Salt Flats), Tooele County: Survey Notes, v. 28, no. 2, p. 1-3.
- Gwynn, J.W., 1996, Character and distribution of subsurface water and brine of the, Paradox basin, southeastern Utah: in Huffman, A.C., Lund, W.R., and Godwin, L.H., editors, Geology and Resources of the Paradox Basin: Utah Geological Association Guidebook 25, p. 351-361.
- Gwynn, J.W., 1996, Commonly asked questions about Utah's Great Salt Lake and ancient Lake Bonneville: Utah Geological Survey Public Information Series 39, 22 p.
- Gwynn, J.W., 1997, Oft gestellte Fragen Überden Grossen Saizsee und überden uralten Lake Bonneville im Staat Utah : Utah Geological Survey Offentliche Auskunftsserie Nr. 55, 23 p. (Übersetzerin B. Long-Murdock)
- Gwynn, J.W., 1998, Great Salt Lake, Utah: chemical and physical variations of the brine and effects of the SPRR causeway, 1966-1990, in Pitman, J.K., and Carroll, A.R., editors, Modern and Ancient Lakes - new problems and perspicitves: Utah Geological Association Guidebook 26, p. 71-90.
- Gwynn, J.W., 1998, Potential mineral precipitation and water compatibilities related to the Drunkards Wash Project, Carbon County, Utah: Utah Geological Survey Report of Investigation 241, 22p.
- Gwynn, J.W., 2000, Salinity and Chemistry of Great Salt Lake Waters, contrubuted a section in the DNR-GSL Comprehensive Management Plan - Resource Document.
- Gwynn, J.W., 2000, The waters surrounding Antelope Island, Great Salt Lake, Utah, in King, Jon, and Willis, G.C., editors, The Geology of Antelope Island, Davis County, Utah: Utah Geological Survey, Miscellaneous Publication 00-1, 163 p.
- Gwynn, J.W., 2000, The extraction of mineral resources from Great Salt Lake, Utah - History, Developmental Milestones, and factors influencing salt extraction, in Bon, R.L., Riordan, R.F., Tripp, B.T., and Krukowski, S.T., editors, Proceedings of the 35th Forum on the geology of industrial minerals - The Inter-mountain West Forum, 1999, Utah Geological Survey, Miscellaneous Publication 01-2, 286 p.
- Gwynn, J.W., 2002, A lake divided - a history of the Southern Pacific Railroad causeway and its effect on Great Salt Lake, Utah: Utah Geological Survey Survey Notes, v. 34, no. 1, p. 3-6.
- Gwynn, J.W., editor, 2002, Great Salt Lake - an overview of change: Utah Geological Survey, Department of Natural Resources Special Publication, 600 p. (A collection of 53 articles, of which seven articles were authored or co-authored by Gwynn).

Gwynn, J.W., Boden, Taylor, Rippy, and Krahulec, Ken, 2005, Geothermal and mineral evaluation of the Tooele Army Depot (TAD) tract, Rush Valley, Tooele County, Utah: Utah Geological Survey report prepared for the Utah School and Institutional Trust Lands Administration, 49 p.

Utah Geological Survey, 2006, 100 years of exploration – and still the place to find oil and gas: Utah Geological Survey Public Information Series 71, p. 24 p. (Gwynn contributed page on tar sand resources).

Gwynn, J.W., 2006, Saline minerals, *in* Whitley, Colleen, editor, From the ground up – the history of mining in Utah: Logan, Utah State University Press, p. 101-125.

Gwynn, J.W., 2006, History and resource characterization of Sevier Lake, Millard County, Utah: Utah Geological Survey Miscellaneous Publication 06-6, variously paginated.

Gwynn, J.W., 2006, Petroleum and gas occurrences and development history in Box Elder County, Utah, *in* Harty, K.M., and Tabet, D.E., editors, Geology of northwest Utah: Utah Geological Association Publication 34, 13 p. (This publication came out as a CD)

Tripp, B.T., Kirschbaum, J.J., Vanden Bert, M.D., Rupke, A.L., Gwynn, J.W., Boden, Taylor, and Blackett, R.E., 2006, Chemical analyses of selected limestone, silica, and dolomite samples collected in northwest, Utah, *in* Harty, K.M., and Tabet, D.E., editors, Geology of northwest Utah: Utah Geological Association publication 34, 16 p. (This publication came out as a CD).

Chidsey, T.C., Jr., Gwynn, J.W., Morgan, C.D., Vanden Berg, M.D., and Seneshen, David, 2006, The Mississippian Leadville Limestone exploration play, Utah and Colorado-exploration techniques and studies for independents (Semi-annual technical progress report for October 1, 2005 to March 31, 2006, done under National Petroleum Technology Office contract no. DE-FC26-03NT15424): Utah Geological Survey contract deliverable, 37 p. (Gwynn contribution titled Mississippian/Devonian and Pennsylvanian brine chemistry and trends within the Paradox Basin, Utah – Results and discussion).

Gwynn, J.W., 2006, Utah's oil-sand resources (presented to the Western U.S. Oil Sands Conference, September 21. 34 slides.

Gwynn, J.W., and Taylor, Boden, 2006, Industrial mineral, metal, and geothermal potential of the Crescent Junction tract, Grand, Utah (prepared for the Utah School and Institutional Trust Lands Administration): variously paginated.

Gwynn, J.W., 2006, Tar sand resources of Utah, *in* 100 years of exploration – and still the place to find oil and gas, p. 24.

Gwynn, J.W., Boden, Taylor, Carney, Stephanie, and Tripp B.T., 2007, Mineral and water resources and geologic hazards of SITLA's Spanish Valley tract, Grand and San Juan

Counties, Utah (Prepared for the Utah School and Institutional Trust Lands).  
Administration: Utah Geological Survey, variously paginated.

Gwynn, J.W., 2007, Great Salt Lake brine chemistry databases and reports – 1966-2006: Utah Geological Survey Open-file report 485 (CD).

Gwynn, J.W., 2007, The salt content of Great Salt Lake – a valuable resource (Presented to the American Water Resources Association, Utah Section on May 15: Utah Geological Survey, 33 slides.

Gwynn, J.W., and Hanson, F.V., 2007, Annotated bibliography of Utah tar sands and related information: Utah Geological Survey Open File Report 503, (CD). Update in progress.

Gwynn, J.W., 2008, Tar sand data for the P.R. Spring and Hill Creek areas, Uintah and Grand Counties, Utah: Utah Geological Survey, Open-File Report 527, (CD).

Gwynn, J.W., 2009, The occurrence and development of the saline resources of western Utah, *in* Tripp, B.T., and Krahulec, Ken, editors, *Geology and geologic resources and issues of Western Utah*: Utah Geological Association publication 38.

Gwynn, J.W., 2010, Sunnyside tar sand deposit - data and references from industrial exploration projects: Utah Geological Survey Open-File Report 566, on CD.

#### **PEER REVIEWER FOR THE FOLLOWING ARTICLES**

Jarecki, Lianna, and Walkey, Mike, 2006, Variable hydrology and salinity of salt ponds in the British Virgin Islands: To be published by Saline Systems, an on-line publication service.

Alipour, Samad, 2006, Hydrogeochemistry of seasonal variation of Urmia Salt Lake, Iran: To be published by Saline Systems (in review), an on-line publication service.

Yazicigil, Hasan, Cevat, E.R., Camur, M.Z., and Duru, Uygur, 2006, Hydrogeological modeling of groundwater in the Kazan Trona Field, Ankara, Turkey, part 1, Hydrogeological and hydrogeochemical characterization: To be published in the *Hydrogeology Journal*.

White, W.W., III, and Terrazas, Moises, 2006, Analysis of recent and historic salt-crust thickness measurements and assessment of their relationship to the salt laydown project, Bonneville Salt Flats, Tooele County, Utah, *in* Harty, K.M. and Tabet, D.E., editors, *Geology of northwestern Utah*: Utah Geological Association Guidebook no. 34, 34 p., 6 appendices.

Jones, B.F, White, W.W., Conko, K.M., Webster, D.M., Kohler, J.F., 2009, Mineralogy and fluid chemistry of surficial sediments in the Newfoundland Basin, Tooele and Box Elder Counties, Utah: Utah Geological Survey Open-File Report 539, variously paginated.

Nie, Zhen, Bu, Lingzhong, Zheng, Mianping, and Zhang, Yongshegn, in review, Crystallization path of salts from brine in Zabuye Salt Lake, Tibet, during isothermal evaporation:

This chapter will be included in the book being published from the ISSLR conference held in SLC during May 2008.

## **OTHER**

Dr. Gwynn has served on the Great Salt Lake Technical Team since its inception in the 1970s, the Culvert (SPRR causeway) monitoring committee (a committee within the GSLTT), the Bonneville Salt Flats technical review committee, and the Great Salt Lake Minerals Interagency Taskforce. He has also made numerous presentations related to Great Salt Lake, Utah's tar sand resources, and planned and lead several Great Salt Lake-related field trips.

Dr. Gwynn retired from the Utah Geological Survey on November 16, 2009 after 34 years of service.

## Don S. Paul



*Don Paul*

Don is president of AvianWest Inc., a bird and habitat conservation business. He currently serves on the Shorebird Science Team for the Intermountain West Joint Venture and recently served as a committee member of the Waterbird Conservation Council of the Americas. He is an active member of the Linking Communities, Wetlands and Migratory Birds, Utah Committee. He also consults for a variety of organizations interested in conservation as a fundamental part of doing business and contributing to the quality of life.

He is a career wildlife biologist having served 34 years in several positions for the Utah Division of Wildlife Resources and four years as the Great Basin Bird Conservation Region Coordinator. He is published in both scientific and popular conservation literature. His career emphasis takes two directions, conservation biology with emphases in international community conservation linkages and avian conservation with experience in large-scale landscape bird monitoring.

Linking Communities, Wetlands and Migratory Birds is an experiment in range-wide bird conservation founded in the idea that communities can make a difference in their quality of life through conservation and stewardship of the natural resources that surround them. It is a practical example of the notion to think globally, act locally. Its peculiar worth is grounded in focusing on specific migratory bird populations and specific communities that affect their quality of life. The communities sharing similar migratory bird resources work together toward achieving conservation goals. The out comes are both challenging and stimulating and often serendipitous.