PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM
Memorandum

TO: Governance Committee (GC)
FROM: Executive Director's Office (EDO)
RE: New Members for PRRIP Independent Scientific Advisory Committee (ISAC)
DATE: November 22, 2013

Recommendation

The EDO recommends GC approval of two new members for the ISAC in 2014 as discussed below. Via electronic communication in November 2013, the Technical Advisory Committee (TAC) supported appointing these two new candidates.

Atkins submitted the attached report (**Exhibit A**) in response to the Program's request for new ISAC members to replace two current ISAC members rotating off the committee at the end of 2013. Atkins identified four potential candidates for the ecological statistics slot and eight candidates for the geomorphology slot. After reviewing the report, the EDO and TAC recommend the GC consider the following new ISAC members:

Name	Affiliation	Area of Expertise	Reasoning	Replacing:
Jennifer Hoeting	Colorado State University	Ecological statistics	***Recommend appointment for new three-year term (2014-2016)***; background in statistics related to estimating sandbar size and bird migration patterns; extensive experience with ecological statistics including spatial statistics, Bayesian methods, and model selection	**Philip Dixon** Iowa State University
Edmund Andrews	Tenaya Water Resources	Hydrology Biogeochemistry Geomorphology	***Recommend appointment for new three-year term (2014-2016)***; Experience with other large-scale restoration/recovery programs including the Colorado River (Glen Canyon) and the Trinity River; extensive experience with geomorphology, streamflow, and sediment supply; former chair of the Trinity River Restoration Program Science Advisory Committee (2006-2008)	**Robb Jacobson** USGS

Next Steps

If the GC appoints these two new ISAC members, both new members would begin serving a full three-year ISAC term beginning January 1, 2013. Dixon and Jacobson will be cycled off the ISAC but will be asked to provide some mentoring of the two new ISAC members early in 2014 and will be invited to attend the 2014 AMP Reporting Session.

EXHIBIT A

PRRIP INDEPENDENT SCIENCE REVIEW CONTRACT SERVICES REPORT

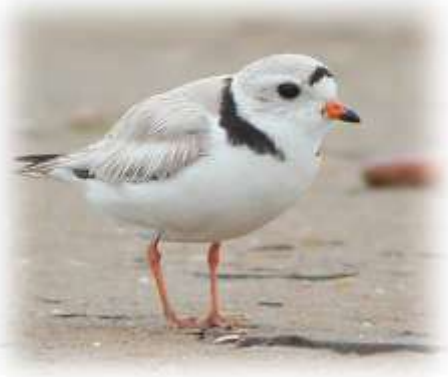
Platte River Recovery Implementation Program

INDEPENDENT SCIENCE REVIEW
CONTRACT SERVICES REPORT

Submitted by

ATKINS

October 2013



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1.0 Introduction and Background

The Governance Committee (GC) of the Platte River Recovery Implementation Program (Program) is in the process of identifying two prospective candidates to serve on the Independent Scientific Advisory Committee (ISAC). The Program is intended to address issues related to endangered species and the loss of critical seasonal habitat in the Platte River in central Nebraska by managing land and water resources using the principles of adaptive management (AM). The application of AM to the Platte River will provide benefits for four protected species:

- Whooping Crane
- Interior Least Tern
- Pallid Sturgeon
- Piping Plover

This report was prepared to assist with the identification of prospective candidates for two positions on the ISAC. The GC is seeking replacement members for the ecological statistics and hydrology/biogeochemistry/geomorphology position; however, the current members (Philip Dixon and Robert Jacobson, respectively) are being considered for possible extension. In addition to the two current ISAC members, Atkins, North America, hereafter referred to as Atkins, identified three candidates for the ecological statistics position and seven candidates for the hydrology/biogeochemistry /geomorphology position. Additional candidates were selected for the latter position to provide a broad spectrum of experience to select from, including participation in other riverine restoration programs, expertise in sand-bed river systems and knowledge of sediment supply and transport in dam-regulated rivers.

Atkins prepared its first report for the Program in 2009, which included a pool of potential candidates to comprise the initial ISAC. In 2012 Atkins prepared its second report which identified candidates for the applied science/AM and avian ecology positions. This report is modeled after the first two and describes the process Atkins used to identify potential candidates and includes short biographical sketch forms, curricula vitae (CV) and signed no-conflict-of-interest statements for each candidate.

2.0 Selection of Independent Scientific Advisory Committee Candidates

2.1 Background

As detailed in the ISAC Scope of Work (SOW), the ISAC provides scientific advice and recommendations pertaining to the implementation of the AM Plan, related monitoring and research, and other Program activities implemented during the First Increment (2007-2019) of the Program.

Members of the ISAC are empanelled for a term of one to three years. Preferred areas of expertise for members of the ISAC include: (1) hydrology; (2) geomorphology; (3) ecological/biological statistics; (4) riverine ecology; and (5) fish/wildlife biology. The ISAC Charter dated December 7, 2005 indicates "*there should be a balance between scientists with specific knowledge of the Platte River basin and those with a more broad and diverse experience*."

As defined in the ISAC Charter, prospective ISAC members should possess the following qualifications:

- Proven achievement in a relevant scientific discipline which may include biology, ecology, fisheries, hydrology, riverine geomorphology, statistics, wildlife ecology, and other relevant disciplines;
- A strong record of scientific accomplishment documented by contributions to peer-reviewed literature and/or other evidence of creative scientific accomplishment;
- Proven standards of scientific integrity, independence, and objectivity;
- Ability to develop creative solutions to complex problems; and
- Interest and ability to work cooperatively in an interdisciplinary setting.

2.2 Identification of Potential Independent Scientific Advisory Committee Candidates by Atkins

The following is a brief summary of the process Atkins used to identify potential ISAC members; the March 2009 Atkins report provides additional detail.

Step 1: Develop clear understanding of the required expertise of each position. This includes a discussion with the Director of Natural Resources to obtain specific information on desired qualifications and experience. Atkins was directed to identify candidates with the following qualifications and experience:

- Ecological statistics: Statistical experience with river systems, ideally in large-scale river restoration programs; and
- Hydrology/biogeochemistry/geomorphology: Practical geomorphologist familiar with large river systems, particularly sand-bed rivers, and ideally with experience dealing with management implications in large-scale river restoration programs.

Step 2: Consult subject matter expertise network for potential candidates. This network includes, but is not limited to, personal contacts, individuals previously considered for peer reviews, and recommendations from other subject-matter experts with similar expertise.

Step 3: Contact prospective ISAC members. Prospective members were contacted to determine their interest, availability and willingness to serve. Time commitments, experience and potential conflicts of interest were also discussed. A copy of the SOW was provided to each candidate.

Step 4: Obtain CVs and biographical sketch forms from all candidates. Each candidate was asked to provide their CV and fill out a short biographical sketch highlighting their education, skills and experience.

Step 5: Obtain "no conflict-of-interest" statements from each candidate. Each candidate was asked to sign a "no conflict of interest" form (Appendix B).

3.0 Potential Independent Scientific Advisory Committee Candidates

Listed below are the potential ISAC candidates identified by Atkins. These candidates have been critically reviewed to avoid conflicts of interests and ensure availability to serve. Immediately following Table 3-1 are one-page biographical sketches for each proposed ISAC member. For additional information about each candidate, please refer to their CVs in Appendix A.

Table 3-1: Potential ISAC Candidates

Name	Affiliation	Proposed ISAC Position
Philip Dixon*	Iowa State University Department of Statistics	Ecological Statistics
Robert Dorazio	U.S. Geological Survey Southeast Ecological Science Center	Ecological Statistics
Brian Gray	U.S. Geological Survey Upper Mississippi Environmental Sciences Center	Ecological Statistics
Jennifer Hoeting	Colorado State University Department of Statistics	Ecological Statistics
Edmund (Ned) Andrews	Tenaya Water Resources, LLC	Hydrology/Biogeochemistry/ Geomorphology
Tim Hanrahan	GeoEngineers	Hydrology/Biogeochemistry/ Geomorphology
Robert Jacobson*	U.S. Geological Survey Columbia Environmental Research Center	Hydrology/Biogeochemistry/ Geomorphology
Pierre Julien	Colorado State University Department of Civil Engineering	Hydrology/Biogeochemistry/ Geomorphology
G. Mathias (Matt) Kondolf	University of California at Berkeley Department of Landscape Architecture and Environmental Planning	Hydrology/Biogeochemistry/ Geomorphology
Eric Larsen	University of California at Davis Department of Human Ecology (Landscape Architecture Program)	Hydrology/Biogeochemistry/ Geomorphology
Gregory Pasternack	University of California at Davis Department of Air, Land and Water Resources	Hydrology/Biogeochemistry/ Geomorphology
John Pitlick	University of Colorado at Boulder Geography Department	Hydrology/Biogeochemistry/ Geomorphology

*Current ISAC member

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Proposed ISAC Members

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Philip Dixon, Iowa State University

Proposed ISAC Member for Platte River Recovery Implementation Program

Name	Philip Dixon
Title	Professor
Affiliation	Department of Statistics, Iowa State University
Address	Snedecor Hall, Ames IA 50010-1210
Phone #	515-294-2142 or 294-6828
E-mail	pdixon@iastate.edu

Education	MS Statistics - Cornell University, 1984; PhD Ecology and Evolutionary Biology - Cornell University 1986

Unique Qualifications

- International recognized expert in biological statistics
- Experience in recovery plan evaluation and implementation
- Fellow, American Statistical Association
- Author of over 100 peer-reviewed publications

Short Biography of Proposed ISAC Member

Philip Dixon's academic life focuses on using statistics to answer interesting biological questions, especially those involving ecology and the environment. Initially trained as an ecologist, he discovered statistics during graduate school. Following his PhD, he worked with Dr. Bob Cook on the population biology and recovery planning for threatened and endangered plants. He then became the statistician for the Savannah River Ecology Lab. During his 11 years at the lab, he worked on various statistical aspects of ecological and environmental monitoring, spatial segregation, testing for the absence of trend, and other ecological problems. He served on a NRC committee to evaluate environmental monitoring and risk assessment for resettlement of Rongelap Island and an International Commission on Radiation Units and Measures report on sampling radionuclides in the environment. The focus on statistical applications has continued in his current position, as professor in the Department of Statistics at Iowa State University. Current projects include developing hierarchical models that use multiple sources of information to improve population modeling and decision making for Mourning Dove management.

Robert Dorazio, U.S. Geological Survey

Proposed ISAC Member for Platte River Recovery Implementation Program

Name	Robert M Dorazio
Title	Research Statistician
Affiliation	U.S. Geological Survey
Address	7920 NW 71 Street, Gainesville, FL 32653
Phone #	352-264-3476
E-mail	bdorazio@usgs.gov

Education Ph.D. University of Michigan

Unique Qualifications

Prior to his position as Research Statistician for the USGS's Southeast Ecological Science Center, Robert Dorazio was the Research Fishery Biologist for the USFWS's National Fisheries Research Center in Leetown, WV. He co-authored the book Hierarchical Modeling and Inference in Ecology (2008) and has numerous biostatistical publications. Dr. Dorazio has served on several Natural Resource Management and Department of Interior review panels.

Short Biography of Proposed ISAC Member

Robert Dorazio is a Research Statistician at the U.S. Geological Survey's Southeast Ecological Science Center. He also holds a Courtesy Associate Professorship in the Department of Statistics at the University of Florida. His research is motivated primarily by statistical inference problems that arise in the general areas of population dynamics, community ecology, and conservation biology. In solving these problems he develops and applies novel sampling designs and novel statistical models in quantitative investigations of natural populations or communities of animals (including imperiled or declining species). He is also interested in developing the theory and practice of adaptive decision making in problems of natural resource management.

Brian Gray, U.S. Geological Survey

Proposed ISAC Member for Platte River Recovery Implementation Program

Name	Brian Gray
Title	Statistician
Affiliation	US Geological Survey
Address	2630 Fanta Reed Rd, La Crosse, WI 54603
Phone #	608-781-6234
E-mail	brgray@usgs.gov

Education BS(botany), MS(biology), PhD(biostatistics)

Unique Qualifications

* Experience and training in statistics and science
* Publications in both statistics and science journals
* Statistical specialty: the analysis of clustered, observation data
* Current position of 12 years mixes research and consulting, and includes 12 years as statistician for the USACE's Long Term Resource Monitoring Program on the Upper Mississippi and Illinois Rivers.

Short Biography of Proposed ISAC Member

My interests in conservation and environmental issues began as a child, and then developed via undergraduate foci of ecology and chemistry, a post-graduate diploma in natural resources, and a Master's degree with focus of ecological toxicology (and statistics). After working as an environmental toxicologist, I returned to school to study biostatistics. The resulting degree led to my current position as a research statistician with the US Geological Survey; this position includes that of statistician for the US Army Corps of Engineers' Long Term Resource Monitoring Program (LTRMP; the LTRMP oversees the collection and analysis of ecological and environmental data collected from the Upper Mississippi and Illinois Rivers). My work for the USGS has focused primarily on the analysis of ecological or environmental monitoring data that are clustered within years, lakes or other groups. My current position also includes a substantial consulting component--and on both analytical and design issues. As examples, I recently oversaw analyses of whooping and sandhill crane behavior data from Necedah National Wildlife Refuge (King et al., in review), and provided guidance on the design of a field experiment with zebra and native mussels. I am willing and able to evaluate hypothesis clarity, the reasonableness of monitoring and research designs (given objectives), the quality of data collection procedures, the utility of sampling methods, and methods to analyze and synthesize data. I am interested in collaborating within a multidisciplinary setting to develop approaches for addressing the conservation and environmental questions faced by the PRRIP.

Jennifer Hoeting, Colorado State University

Proposed ISAC Member for Platte River Recovery Implementation Program

Name	Jennifer Hoeting
Title	Professor and Interim Department Chair
Affiliation	Department of Statistics, Colorado State University
Address	Fort Collins, CO 80523-1877
Phone #	970-988-1184
E-mail	jah@rams.colostate.edu

Education PhD, MS in Statistics, University of Washington

Unique Qualifications

Expert in statistical methods for ecology and computational statistics.

Considerable experience working in interdisciplinary groups on ecological problems.

Particular expertise for the ISAC: I have worked on a number of problems that are relevant to the Platte River Recovery program. I have worked on a project to estimate sandbar size to determine the impacts of increased river flows in the Colorado River, several projects to investigate bird migration patterns in the US and the impact of avian influenza on waterfowl, a multi-year project to develop statistical methods to monitor streams, a multi-year project to determine the condition of wetlands in Colorado for the US EPA.

Short Biography of Proposed ISAC Member

Jennifer A. Hoeting is a Professor and interim Department Chair in the Department of Statistics at Colorado State University. She is co-author of a best-selling Wiley textbook on computational statistics that is in its second edition. Hoeting is an award-winning teacher who co-leads large research efforts for the National Science Foundation and the U.S. Environmental Protection Agency. She is a Fellow of the American Statistical Association. She serves as an Associate Editor the *Journal of Agricultural, Biological, and Environmental Statistics (JABES), Environmetics*, and has served as AE for three editors of the *Journal of the American Statistical Association*. She is former chair of the ASA Section of Statistics and the Environment. She has been advisor to more than 30 PhD and MS students. Her research interests include spatial statistics, Bayesian methods, and model selection/model averaging.

Edmund Andrews, Tenaya Water Resources, LLC

Proposed ISAC Member for Platte River Recovery Implementation Program

Name	Edmund D. Andrews
Title	Principal
Affiliation	Tenaya Water Resources
Address	766 Grant Place, Boulder, CO
Phone #	303-939-9398
E-mail	ned_andrews@att.net

Education	B.S. and M.S. Geophysics, Stanford University and Ph.D. Geology, Univ of California

Unique Qualifications

The primary focus of my professional career over the past 35 years has been to understand the adjustment of river channels to the alteration of the streamflows and sediment supply and to develop approaches needed to restore those channel features that provide aquatic habitat and recreational resources. During this time, I have participated in several long-term programs to maintain and enhance the fluvial resources of rivers throughout the western United States, including the Green and Provo Rivers, Utah, Colorado River through Grand Canyon National Park, the Trinity River, California and the Walker River, Nevada.

Edmund (Ned) Andrews received B.S. and M.S. degrees in Geophysics from Stanford University and a Ph.D. degree in Geology from the University of California, Berkeley. He joined the USGS in 1975 and served as Chief of the River Mechanics Project within the Water Resources Division's National Research Program until his retirement in July of 2009. Ned become a Fellow of the Institute for Arctic and Alpine Research, and served as a Research Professor at the University of Colorado from 2009 to 2013. His research, described in more than 60 journal articles and book chapters, has focused primarily on the adjustment of river channels to an altered streamflow regime and sediment supply. This research has concerned a wide variety of rivers affected by various natural and anthropogenic impacts. The goal of this research is to develop the analytical methods and approaches needed to maintain and restore the important geomorphic and ecological features of river channels. Ned was a principal investigator of the 1996 experimental flood released into the Colorado River through Grand Canyon National Park. Since 1988, Ned has served as an expert witness in court proceedings to support the establishment instream flow water rights for National Forests and National Parks in several Western States. Ned served as a scientific advisor to the U. S. Bureau of Reclamation's Trinity River Restoration Program from 2003 to 2008, including chairing the science advisory committee from 2006 to 2008. His most recent professional activities have included an evaluation of streamflows and sediment transport in the Walker River, NV for the Lahoutan Cutthroat Trout Recovery Program, USFWS.

Tim Hanrahan, GeoEngineers

Proposed ISAC Member for Platte River Recovery Implementation Program

Name	Tim Hanrahan
Title	Senior Fluvial Geomorphologist
Affiliation	GeoEngineers
Address	1201 Jadwin Ave. Suite 202, Richland, WA 99352
Phone #	509-209-2821
E-mail	thanrahan@geoengineers.com

Education PhD, Environmental Science (fluvial hydraulics), Washington State University

Unique Qualifications

Involved with contract research for the Integrated Science Program of the U.S. Army Corps of Engineers' Missouri River Restoration Program for seven years

Short Biography of Proposed ISAC Member

Tim is a Senior Fluvial Geomorphologist with over 20 years of experience. His professional interests and projects focus on river processes and associated interactions with aquatic organisms and their habitats. His current and recent projects include fluvial geomorphic assessments of historic and contemporary gravel-bed river conditions, and evaluations of potential future channel adjustments. Many of these geomorphic assessments are applied to river restoration projects for the purposes of identifying the underlying processes that are responsible for the creation and maintenance of riverine and floodplain habitats. Tim incorporates this understanding of geomorphic processes into the analyses of restoration alternatives and the design of restoration actions. Tim's areas of expertise include river hydraulics and sediment transport, quantitative fluvial geomorphology, assessment and modeling of aquatic habitats, and evaluation of groundwater – surface water interactions in rivers. Tim is also an adjunct faculty member in the School of Earth and Environmental Sciences at Washington State University where he teaches Fundamentals of Environmental Hydrology.

Robert Jacobson, U.S. Geological Survey

Proposed ISAC Member for Platte River Recovery Implementation Program

Name	Dr. Robert Jacobson
Title	Research Hydrologist
Affiliation	U.S. Geological Survey
Address	4200 New Haven Road, Columbia, MO 65201
Phone #	573-876-1844
E-mail	rjacobson@usgs.gov

Education	Ph.D. Whiting School of Engineering, The Johns Hopkins University, 1986

Unique Qualifications

-Internationally recognized expert in river habitat dynamics
-25 years of experience with science and management of large rivers
-Unique background in physical river processes and links to ecolsystem functions.
-Served as member of expert panels on management of the Upper Mississippi River, adaptive management of the Missouri River, and technical advisor to Missouri River Spring Rise process and Missouri River 2003 Biological Opinion.

Short Biography of Proposed ISAC Member

Dr. Jacobson has been a research scientist with the U.S. Geological Survey for 25 years, working on diverse projects including landslide hazards, neotectonics, Quaternary landscape evolution, and fluvial geomorphology. He is currently chief of the USGS River-Corridor Habitat Dynamics Project and supervises a staff of geomorphologists and hydrologists studying relations between abiotic and biotic components of riverine ecosystems. Project research focuses on river-corridor habitat dynamics, with an emphasis on large, multipurpose rivers. Related research includes understanding the links from land use to disturbance in stream ecosystems, sediment routing at the landscape scale, sediment transport in sandbed rivers, and the role of science in adaptive management. This research is highly interdisciplinary, integrating geomorphology, hydrology, sediment transport, river engineering, and ecology. Dr. Jacobson has also served as an associate editor for Water Resources Research and has recently served on expert committees for the Upper Mississippi Navigation study, the Missouri River Federal Interagency Roundtable, The Missouri River Spring Rise Plenary Group, the Ecological Society of America, and the U.S. Fish and Wildlife Service's 2003 Biological Opinion.

Pierre Julien, Colorado State University

Proposed ISAC Member for Platte River Recovery Implementation Program

Name	Pierre Julien
Title	Professor of Civil and Environmental Engineering
Affiliation	Colorado State University
Address	Engineering Research Center B-205
Phone #	(970)-491-8450
E-mail	pierre@engr.colostate.edu

Education PhD in 1983

Unique Qualifications

35 years of professional engineering experience.
Expertise in river engineering and sedimentation.
Two textbooks on "Erosion and Sedimentation" and "River Mechanics" at Cambridge U.Press.

Short Biography of Proposed ISAC Member

PIERRE Y. JULIEN, Ph.D., P.Eng.
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Tel: (970) 491 8450
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August 2013

EDUCATION

Degree	Field	Institution	Year
Ph.D.	Civil Engineering (hydraulics)	Laval University	1983
M.Sc.	Civil Engineering (hydraulics)	Laval University	1980
B.Sc.A	Civil Engineering	Laval University	1977

PROFESSIONAL EXPERIENCE

Dr. Julien is professor of Civil and Environmental Engineering at CSU. As Professional Engineer, he has completed projects for 50 different agencies including UNESCO and the World Bank.

SUMMARY of RESEARCH ACTIVITIES

Dr. Julien authored more than 500 scientific contributions including two textbooks, 20 lecture manuals and book chapters, 170 refereed journal articles including 90 full papers in scientific journals, 150 professional presentations, 190 conference papers and 115 technical reports. He supported and guided more than 100 graduate students (including 37 Ph.D.) to complete engineering degrees. He delivered 15 keynote addresses at international conferences. He received the H.A. Einstein Award for his research on sedimentation and river mechanics.

G. Mathias Kondolf, University of California at Berkeley

Proposed ISAC Member for Platte River Recovery Implementation Program

Name	G. Mathias Kondolf
Title	Professor
Affiliation	University of California, Dept Landscape Architecture
Address	202 Wurster Hall, Berkeley CA 94720
Phone #	510 643 6165
E-mail	kondolf.berkeley@gmail.com

Education	PhD Geography & Environmental Engineering, Johns Hopkins U, MS Earth Sciences UC Santa Cruz, AB Geology Princeton U

Unique Qualifications

Research focus on downstream effects of dams and strategies for restoration, including restoration of flow regimes, passing sediment through/around reservoirs, and dealing with vegetation encroachment. Some experience with relevant agencies, including the US Army Corps.

Short Biography of Proposed ISAC Member

G. Mathias (Matt) Kondolf is a fluvial geomorphologist and environmental planner, specializing in environmental river management and restoration. As Professor of Environmental Planning at the UC Berkeley, he teaches courses in hydrology, river restoration, and environmental science, and serves as Chair of the Department of Landscape Architecture and Environmental Planning. His research concerns human-river interactions broadly, with emphasis on management of flood-prone lands, sediment management in reservoirs and regulated river channels, downstream effects of dams, and river restoration. Current research areas include the Mekong, Lower Colorado, Trinity and Klamath Rivers, and Mediterranean-climate rivers in California and the Mediterranean basin. He has provided expert testimony before the US Congress, the California legislature, California Water Resources Control Board, the International Court of Justice (the Hague), and in various legal proceedings in the US. He has published extensively in international peer-reviewed journals and his book Tools in Fluvial Geomorphology (Wiley 2003, second edition forthcoming) is the reference work for methods in the field. He has received two Fulbright awards, the Merit Award from the Council of Educators of Landscape Architecture, and appointments as Clarke Scholar at the Institute for Water Resources in Washington, fellow of the Landscape Architecture Foundation, and served on two National Academy of Science panels, the Environmental Advisory Board to the Chief of the US Army Corps of Engineers, the Calfed Ecosystem Restoration Program Science Board, and the Independent Science Board for the Russian River.

Eric Larsen, University of California at Davis

Proposed ISAC Member for Platte River Recovery Implementation Program

Name	Eric Larsen
Title	Research Scientist
Affiliation	University of California at Davis
Address	
Phone #	530-400-0561
E-mail	ewlarsen@ucdavis.edu

Education	Ph.D. Civil Engineering, Environmental Water Resources Division. University of California, Berkeley, 1995. M.S. Civil Engineering, Environmental Water Resources Division. University of California, Berkeley, 1986. B.A. Engineering and Applied Physics, Harvard University, 1969.

Unique Qualifications

Short Biography of Proposed ISAC Member

As a Research Scientist at UC Davis, Dr. Larsen has used his expertise in fluvial geomorphology to develop an interdisciplinary research program, publication record, and applied projects that address vital issues in river management, restoration, habitat formation and quantitative fluvial geomorphology. As a consultant and senior technical advisor, Dr. Larsen is active in using this expertise to help with planning and executing various planning, restoration, and geomorphic evaluation efforts on various rivers, including the Sacramento River. His areas of research include the influence of river channel dynamics on fisheries habitat and climate change issues.

As a technical advisor in fluvial geomorphology and hydraulic engineering, Dr. Larsen has applied his expertise in quantitative fluvial geomorphology and river mechanics in coordination with numerous consulting firms, state and federal agencies, and non-profit groups. Dr. Larsen has most recently focused on the interaction between geomorphic processes of natural channel development and how the fluvial geomorphic processes interact with processes of riparian habitat formation. His interdisciplinary training and experience in hydraulic engineering, fluvial geomorphology, and riparian habitat formation provide a basis for strong interdisciplinary work with teams.

Dr. Larsen served as a visiting scholar at the Hydrologic Engineering Center (HEC) in Davis, providing fundamental research related to hydraulic models and ecosystem functions modeling. In particular Dr. Larsen has collaborated on upgrades to the HEC Ecosystem Functions model (EFM), and has produced a technical report, which will be distributed through ERDC, reviewing and comparing software packages that can be used for evaluating the interaction between flow and ecosystem processes. Dr. Larsen has served as a science advisor for many public agencies and private groups, including a work group of State and Federal Agencies advising the US Army Corps of Engineers on their Sacramento River Bank Protection Program, and a multi-agency technical advisory group for Sacramento River Off-stream Storage (North of Delta Off-stream Storage), a 2-billion dollar State of California project.

Gregory Pasternack, University of California at Davis

Proposed ISAC Member for Platte River Recovery Implementation Program

Name	Gregory Brian Pasternack
Title	Professor of Watershed Hydrology; Chair of the Hydrologic Sciences Graduate Gr
Affiliation	University of California at Davis
Address	39601 Lupine Court, Davis, CA 95616
Phone #	530-902-3758
E-mail	gpast@ucdavis.edu

Education	Ph.D., Environmental Engineering, The Johns Hopkins University, Baltimore, MD, 1998; M.S., Environmental Water Resources Engineering, University of California, Berkeley, CA, 1994; B.A., Earth Science; Science in Society, Wesleyan University, Middletown, CT, 1993.

Unique Qualifications

Academic interdisciplinary water/sediment scientist spanning basic and applied research as well as experienced associate member of ASCE proficient in river rehabilitation project design, implementation, and monitoring. Wrote a textbook on 2D hydrodynamic modeling. Developed novel methods for analysis of river ecological functions.

Short Biography of Proposed ISAC Member

Dr. Greg Pasternack is Professor of Watershed Hydrology and Chair of the Hydrologic Sciences Graduate Group at University of California at Davis. His education is grounded in quantitative geoscience and engineering, but also spans ecology to yield a unique interdisciplinary capability for assessing rivers and wetlands under modern, degraded regimes and then designing improved systems focusing on self-sustianing processes and landforms that support natural ecosystem functions. Whereas some academic scientists use the "ivory tower" to criticize modern environmental practices from afar, Pasternack has spent the last 15 years actually designing and implementing river rehabilitaiton projects that balance theoretical ideals, novel scientific advancements, and practical natural and institutional realities in the local context. He has worked hand-in-hand with government, industry, stakeholders, and practitioners responsible for caretaking rivers, such as the Yuba, Mokelumne, Trinity, and Feather Rivers in California. Pasternack is a prolific writer who has co-authored 59 peer reviewed journal articles, 12 referred book chapters/reports/proceedings, 25 technical reports, and 100 conference abstracts. These publicaitons span a wide range of basic and applied science topics, such as river processes, estuarine wetland processes, watershed processes, waterfalls, sediment transport and deposition, and chaos theory applied to hydrology. In 2011 he published a textbook on 2D hydrodynamic modeling and ecohydraulic analysis that is the first of its kind to walk practitioners through the steps of quantitative hydraulic, geomorphic, and aquatic ecological analysis of rivers using "Big Data" in the 21st century. Professor Pasternack has mentored 13 MS students, 5 PhD students, 6 postdocs, 12 technicians, and 74 undergraduate assistants. He teaches coursework spanning hydrology, geomorphology, and ecology. he also is highly committed to outreach and service at local, state, and national levels. For example, he served on the board of the California Water Resources Achive, Yuba River Preservation Foundation, and Consortium of Universities for the Advancement of Hydrologic Science, Inc. He also chaired the UC Davis Committee on Academic Freedom and Responsibility and presently is chair of the Hydrologic Sciences Graduate Group. Since 2009 he has served on the Yuba Accord River Management Team providing vision and leadership in physical and ecological assessment of the 25-mi lower Yuba River. Working as a sole practioner on projects that are not suitable for research through the university, Dr. Pasternack is experienced in a variety of environmental consulting practices. For more informaiton, visit http://pasternack.ucdavis.edu.

John Pitlick, University of Colorado at Boulder

Proposed Peer Review Panelist for
Platte River Recovery Implementation Program

Name	John Pitlick
Title	Professor
Affiliation	Geography Department, University of Colorado
Address	Box 260, Univ. Colorado, Boulder, CO, 80309-0260
Phone #	303-492-5906
E-mail	pitlick@colorado.edu

Education PhD, Colorado State University, 1988

Unique Qualifications

- 30 years research experience on fluvial processes in natural and managed river systems
- Member, Peer Review Panel, Recovery Implementation Program for Endangered Fishes in the San Juan River Basin, 2001-pres.
- Member, National Research Council Committee on Hydrology, Ecology, and Fishes of the Klamath River Basin, 2006-2007
- Member, National Research Council, Committee on River Science at the US Geological Survey, 2004-2006.

Short Biography of Proposed Peer Review Panelist

Dr. Pitlick is a Professor in the Geography Department, University of Colorado, where he has taught since 1990. His primary research and professional interests are in the areas of surface-water hydrology and fluvial geomorphology. He has lead three separate studies sponsored by the Upper Colorado River Recovery Implementation Program to determine how hydrologic and geomorphic changes in the upper Colorado River basin have affected habitats used by native fishes, including the endangered Colorado pikeminnow and the razorback sucker. The results of that work show that the primary geomorphic effect of water-management activities has been to reduce the sediment-transport capacity of the river system, leading to a narrower, less complex channel. Nonetheless, suitable habitats are present within many river reaches, and the potential exists to coordinate reservoir operations to augment spring flows to maintain and improve these habitats. Results of this work have been published in a series of peer-reviewed US Fish and Wildlife Service reports and refereed journal papers.

Dr. Pitlick has also worked closely with the US Forest Service STREAM team in Fort Collins, CO, to develop tools to better understand fluvial-transport processes in mountain streams and rivers. The STREAM team has sponsored several projects examining linkages between sediment transport and channel morphology in these high-gradient river systems. In addition, the STREAM team has supported a collaborative effort between John Pitlick, Peter Wilcock, and Yantao Cui to develop PC-based software and users manuals for predicting bed load transport in gravel-bed channels.

Projects initiated in the last several years focus on (1) the effects of streambed disturbance on benthic organisms (in collaboration with W. Lewis, CU-Boulder Center for Limnology); (2) downstream changes in sediment transport capacity and hydrology of the NF Toutle River near Mt. St. Helens, WA (in collaboration with Jon Major, USGS); (3) factors governing sediment supply in the Rocky Mountain Region (in collaboration with Erich Mueller, USGS-GCMRC); and (4) modeling sediment production and transport in French alpine rivers (with Alain Recking, IRSTEA).

Dr. Pitlick is a Fellow of the Geological Society of America, and he also serves as co-director of the Graduate Program in Hydrologic Sciences at CU-Boulder (http://hydrosciences.colorado.edu).

Appendix A – Curricula Vitae

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CURRICULUM VITAE

PHILIP M. DIXON

30 June 2013

EDUCATION

A.B., May 1978,	University of California at Berkeley, Biology
M.S., August 1984,	Cornell University, Ithaca, New York, Statistics
Ph.D., January 1986,	Cornell University, Ecology and Evolutionary Biology

TEACHING EXPERIENCE

Statistical Methods for Researchers, Statistics 401, Iowa State Univ.	1998, 9, 2001, 4, 11, 12
Statistical Design and Analysis of Experiments, Statistics 402, ISU	1999, 2000, 2, 3, 5-9
Advanced Statistical Methods for Research, Statistics 415 (in part), ISU	1999-2000, 2003, 5
Advanced Statistical Methods: Analysis of Species Composition, Stat 415, ISU	2011
Workshop in Statistics, Statistics 493, ISU	2003, 5
Statistical Methods, Statistics 500, Iowa State Univ.	2002, 3, 5, 7, 9
Environmental Statistics, Statistics 505, Iowa State Univ.	2006, 8, 10
Statistical Methods II, Statistics 511, Iowa State Univ.	2011
Ecological Statistics, Statistics 534, Iowa State. Univ.	2001, 3, 7, 9, 11
Ecology Seminar, EEB 698, on Multivariate Analysis of Community Data, ISU	2005, 7
Statistical Analysis of Repeated Measures Data, Univ. of Legon, Ghana	2007
Statistical Analysis of Repeated Measures Data, Univ. Republica, Uruguay	2011
Environmental Statistics, Math 471, Univ. of Otago, New Zealand	1996

POSITIONS HELD

University Professor, Department of Statistics, Iowa State University	2011 to Date
Professor, Department of Statistics, Iowa State University	2002 to 2011
Associate Professor, Department of Statistics, Iowa State University	1998-2002
Member, Graduate Program in Ecology and Evolutionary Biology, ISU	1998-date
Member, Graduate Program in Bioinformatics and Computational Biology, ISU	2000-date
Biostatistician and Assistant / Associate Research Scientist, Savannah River Ecology Lab, University of Georgia	1987-1993 (assistant) 1993-1998 (associate)
Postdoctoral Research Associate, Cornell Plantations	1985-1987

PROFESSIONAL SOCIETIES

American Statistical Association
International Biometrics Society (ENAR)
British Ecological Society
Ecological Society of America
Phi Beta Kappa
Royal Statistical Society
Sigma Xi

GRADUATE STUDENTS ADVISED

Major Professor / Advisor while at Iowa State University

Lu Shen	B.S. Honors, 2011	clustering physical activity profiles
Jake Allred	M.S. 1999	estimating correlation from censored data
Norbert Karp	M.S. 1999	analysis of interval censored dormancy data
Shuyu Zhang	M.S. 2000	fractional factorial experiments with binomial responses
Kari Rabe	M.S. 2000	mixture models for genetic data
Brooke Fridley	M.S. 2000	evaluating extra Poisson variation with small mean counts
Annissa Kuenneth	M.S. 2000	fitting matrix population models to proportional data
Hong Su	M.S. 2000	evaluation of a Bayesian method for diagnostic test data
Jennifer Herberich	M.S. 2001	analysis of crossover trials with binary responses
Cory Heilmann	M.S. 2002	variance of estimated benchmark doses
Wuyan Zhang	M.S. 2002	estimating largest effective dose in quadratic response models
Han Wu	M.S. 2002	estimating fish movement from recapture data
Katy Jensen	M.S. 2004	estimating spatial scale from point locations
Haishin Ozawa	M.S. 2004	modeling mourning dove population dynamics
Kejian Li	M.S. 2004	comparing means when data have excess zeros
Andy Heggensteller	M.S. 2005	weed population dynamics in 2, 3, and 4 year crop rotations
Jessica Chapman	M.S 2006	analysis of prevalence data in a group randomized trial
Gina Borrowman	M.S.2006	testing equality of cross-correlations in repeated panel data
Xiaoli Zhang	M.S. 2006	partial least squares when variances are unequal
Allan Trapp	M.S. 2008	predicting seed longevity
Dale Tessin	M.S. 2010	analysis of spatial patterns when the intensity is non-constant
Yew-Meng Koh	M.S. 2010	Markov-transition modeling of food security
Dennis Lock	M.S. 2011	design of case-cohort studies
Nicholas Michaud	M.S. 2012	integrated population modeling of Mourning Doves
Reuth Kienow	M.S. in prog.	bird population dynamics
Brooke Fridley	Ph. D. 2003	analysis of censored spatial data
Cory Heilmann	Ph. D. 2005	estimating ratios of gases in emission studies
Paul Esker	Ph. D. 2005	population dynamics of plant pathogens
Xia Xu	Ph. D. 2006	toxicokinetic-based survival models
ManYu Yum	Ph. D. 2010	estimating the strength of the Individual Effective Dose
Allan Trapp	Ph. D. 2012	faster 2 stage Monte-Carlo risk assessment
Mark McKelvey	Ph. D. in progr.	adjusting for imperfect detection in CART habitat models
Sachet Shukla	Ph. D. in progr.	statistical inference for gene regulatory networks

Served or currently serving, not as major professor, on 90 M.S. committees and 85 Ph.D. committees at ISU.

Major Professor while at Savannah River Ecology Lab / University of Georgia

Susan Turner	Ph. D. 2004	spatial aspects of competition in nutrient-poor old fields.
Gordon Ward	Ph. D. 2003	estimation of tritrophic predator-prey relationships
Huda Alkaff	M.S. 1997	spatial geomorphology

Served on 10 Ph. D. committees at University of Georgia.

PROFESSIONAL SERVICE (last three years)

Associate Editor, Environmetrics	2010-date
Vice-Chair / Chair, Section on Statistical Ecology, Ecological Society of America	2007-2011
Member, Independent Scientific Advisory Committee, Platte River Restoration	2009-date
Member, Editorial Board, Journal of Vegetation Science	1997-2009

DEPARTMENTAL SERVICE (last three years)

Chair, graduate minor committee	2011-date
Member, Chair's advisory committee	2011-date
Member, MS exam and/or PhD exam committees	2004, 6, 7, 8, 9
Head, VIGRE working group in ecological and environmental statistics	2001-2010
Supervise 4 graduate student consultants in agriculture/biology	1999-date
Organize "consulting lunch"	1999-date

COLLEGE and UNIVERSITY SERVICE (last three years)

University Professor Committee, Provost's office	2012-2014
Supervisory Committee, Ecology and Evolutionary Biology	2010-2013
Graduate Council	2008-2011
Zaffarano Award Committee, Graduate College	2009-2011
MAGS Award Committee, Graduate College	2009
BCB Core course review committee	2009

INVITED SEMINARS (last three years)

Modeling seed germination over time to decide when to regenerate seed lots in long-term storage. Universidad de la Republica, Uruguay	July 2011
Why the buzz about Bayes? Universidad de la Republica, Uruguay	July 2011
Modeling seed germination over time to decide when to regenerate seed lots in long-term storage. Crop Physiology Seminar, ISU	Feb 2011
Statistical models to combine multiple sources of ecological information: insectivorous plants and mourning doves, EEOB Dept., ISU	Jan 2010

AWARDS AND HONORS

Accredited Professional Statistician (Pstat ®), American Statistical Association	2012
Frank Wilcoxon Prize for best practical application paper in Technometrics for Morris et al., 2009.	2010
Master Teacher, College of Liberal Arts and Sciences,	2005
Fellow, American Statistical Association	2003

AWARDS AND HONORS (continued)

Best Basic Science paper in Veterinary Medicine , for Chang et al 2002. Given by Phi Zeta, the national honor society for veterinary medicine.	2002
Distinguished Achievement Medal, American Statistical Association, Section on Statistics and the Environment	1996

GRANTS RECEIVED (last three years) or **PENDING**

Ducks Unlimited, (PI, William Clark, ISU co-PI) Spatial patterns of duck nests in multiple study sites	$20,186	2012
NSF, NSF 2010 program, (co-PI, B. Nikolau, ISU, PI) Metabolomics: a functional genomics tool for deciphering functions of *Arabidopsis* genes in the context of metabolic and regulatory networks,, renewal	$2,900,000	2008-2010
USDA, NRI. (co-pi, D. Mueller, ISU, PI) Facilitating real world crop production research through experimental design and data collection and analysis training.	$75,000	2008-2010
U.S.G..S. Div. Migratory Bird Management (co-PI, D. Otis, ISU, PI) Harvest strategies for Mourning Doves, renewal	$36,000	2008-2010

PUBLICATIONS

Rabinowitz, D., Rapp, J.K. and Dixon, P.M. 1984. Competitive abilities of sparse grass species: means of persistence or cause of abundance. *Ecology* 65:1144-1154.

Rabinowitz, D., Rapp, J.K., Dixon, P.M. and Khieu, A.T. 1986. Separating structural and developmental variability in growth rate estimates for *Andropogon scoparius* Michx. *Bulletin of the Torrey Botanical Club* 112:403-408.

Dixon, P.M., Weiner, J., Mitchell-Olds, T. and Woodley, R. 1987. Bootstrapping the Gini coefficient of inequality. *Ecology* 68: 1548-1551.

Louda, S.M., Dixon, P.M. and Huntly, N.J. 1987. Herbivory in sun versus shade at a natural meadow-woodland ecotone in the Rocky Mountains. *Vegetatio* 72:141-149.

Louda, S.M., Huntly, N. and Dixon, P.M. 1987. Insect herbivory across a sun/shade gradient: response to experimentally-induced in situ plant stress. *Acta Oecologica* 8(3):357-363.

Diamond, S.A., Newman, M.C., Mulvey, M., Dixon, P.M. and Martinson, D. 1989. Allozyme genotype and time to death of mosquitofish, Gambusia affinis (Baird and Girard), during acute exposure to inorganic mercury. *Environmental Toxicology and Chemistry* 8:613-622

Newman, M.C., Dixon, P.M., Looney, B.B. and Pinder, J.E., III. 1989. Estimating mean and variance for environmental samples with below detection limit observations. *Water Resources Bulletin* 25:905-916.

Newman, M.C., Diamond, S.A., Mulvey, M. and Dixon, P. 1989. Allozyme genotype and time to death of mosquitofish, Gambusia affinis (Baird and Girard) during acute toxicant exposure: comparison of arsenate and inorganic mercury. *Aquatic Toxicology* 15:141-156.

Dixon, P.M. and Cook, R.E. 1989. Science, planning, and the recovery of endangered plants. *Endangered Species Update* 6:9-14.

Dixon, P.M. and May, B. 1990 Genetic diversity and population structure of a rare plant: Northern Monkshood (*Aconitum noveboracense*). *New York State Museum Bulletin* 471:167-175. (10)

Palmer, M.W. and Dixon, P.M. 1990. Small scale environmental heterogeneity and the analysis of species distributions along gradients. *Journal of Vegetation Science* 1:57-65.

ROBERT M. DORAZIO

Research Statistician, U.S. Geological Survey, Southeast Ecological Science Center, 7920 NW 71st Street, Gainesville, Florida 32653. Phone: 352-264-3476, Email: bdorazio@usgs.gov

EDUCATION

- Ohio State University, B.S. (major in General Biology from Dept. of Biology, College of Arts and Sciences), 1979
- University of Michigan, Ph.D. (major in Oceanography from Dept. of Atmospheric and Oceanic Science, College of Engineering), 1986

POSTGRADUATE TRAINING

- Survival Analysis of Recapture Data from Marked Animal Populations - A 5-day course. David R. Anderson (Colorado State University), Kenneth P. Burnham (Colorado State University), and Jean-Dominique Lebreton (Montpellier, France). 1991.
- Computer Intensive Statistics in Biology - A 3-day course in randomization tests, Monte Carlo simulation, and bootstrapping. Brian F.J. Manly (University of Otago, New Zealand). 1993.
- Categorical Data Analysis - A 3-day course. Alan Agresti (University of Florida). 1994.
- Generalized Linear Models - A 3-day course. James G. Booth (University of Florida). 1995.
- Extending the Cox Proportional Hazards Model - A 2-day course. Terry Therneau (Mayo Clinic, Rochester, Minnesota). 1996.
- Sampling-based Methods for Bayesian and Likelihood Inference. A 1-day course. Martin Tanner (Northwestern University). 1997.
- Bayes and Empirical Bayes Methods for Data Analysis. A 3-day course. Bradley P. Carlin (University of Minnesota). 1998.
- Applying Finite Mixture Models. A 1-day course. Geoffrey McLachlan (University of Queensland). 2000.
- Introduction to Adaptive Stochastic Dynamic Programming Theory for Adaptive Resource Management. A 2-day course. Bruce Lubow (Colorado State University). 2001.
- Monte Carlo Methods in Bayesian Computation. A 1-day course. Ming-Hui Chen (Worcester Polytechnic Institute) and Joseph Ibrahim (Harvard University). 2001.
- R/Splus System: Advanced Programming. A 2-day course. Thomas Lumley (University of Washington). 2002.

PROFESSIONAL EXPERIENCE

1994–present: Research Statistician, Southeast Ecological Science Center, Gainesville, Florida, U.S. Geological Survey

Dr. Dorazio is a Research Statistician at the U.S. Geological Survey's Southeast Ecological Science Center. He also holds a Courtesy Associate Professorship in the Department of Statistics at the University of Florida. His research is motivated primarily by statistical inference problems that

arise in the general areas of population dynamics, community ecology, and conservation biology. In solving these problems he develops and applies novel sampling designs and novel statistical models in quantitative investigations of natural populations or communities of animals (including imperiled or declining species). He is also interested in developing the theory and practice of adaptive decision making in problems of natural resource management.

1987–1994: Research Fishery Biologist, National Fisheries Research Center, Leetown, West Virginia, U.S. Fish and Wildlife Service

1985–1987: Postdoctoral Research Fellow and Research Associate, Department of Biology, University of Michigan

RECENT PUBLICATIONS

1. Dorazio, R.M., and F.A. Johnson. 2003. Bayesian inference and decision theory - a framework for decision making in natural resource management. Ecological Applications 13: 556–563.
2. Dorazio, R.M., and J.A. Royle. 2003. Mixture models for estimating the size of a closed population when capture rates vary among individuals. Biometrics 59: 351–364.
3. Dodd, C.K. and R.M. Dorazio. 2004. Using counts to simultaneously estimate abundance and detection probabilities in a salamander community. Herpetologica 60: 468–478.
4. Dorazio, R.M. and J.A. Royle. 2005. Estimating size and composition of biological communities by modeling the occurrence of species. Journal of the American Statistical Association 100: 389–398.
5. Dorazio, R.M. and J.A. Royle. 2005. Rejoinder to "The performance of mixture models in heterogeneous closed population capture-recapture." Biometrics 61: 874–876.
6. Dorazio, R.M., H.L. Jelks, and F. Jordan. 2005. Improving removal-based estimates of abundance by sampling a population of spatially distinct subpopulations. Biometrics 61: 1093–1101.
7. Dorazio, R.M., J.A. Royle, B. Söderström, and A. Glimskär. 2006. Estimating species richness and accumulation by modeling species occurrence and detectability. Ecology 87: 842–854.
8. Royle, J.A. and R.M. Dorazio. 2006. Hierarchical models of animal abundance and occurrence. Journal of Agricultural, Biological, and Environmental Statistics 11: 249–263.
9. Royle, J.A., R.M. Dorazio, and W.A. Link. 2007. Analysis of multinomial models with unknown index using data augmentation. Journal of Computational and Graphical Statistics 16: 1–19.
10. Hooten, M.B., C.K. Wikle, R.M. Dorazio, and J.A. Royle. 2007. Hierarchical spatio-temporal matrix models for characterizing invasions. Biometrics 63: 558–567.
11. Jordan, F., H.L. Jelks, S.A. Bortone, and R.M. Dorazio. 2008. Comparison of visual survey and seining methods for estimating abundance of an endangered, benthic stream fish. Environmental Biology of Fishes 81: 313–319.
12. Dorazio, R.M., B. Mukherjee, L. Zhang, M. Ghosh, H.L. Jelks, and F. Jordan. 2008. Modeling unobserved sources of heterogeneity in animal abundance using a Dirichlet process prior. Biometrics 64: 635–644.
13. Dorazio, R.M. 2007. On the choice of statistical models for estimating occurrence and extinction from animal surveys. Ecology 88: 2773–2782.
14. Royle, J.A. and R.M. Dorazio. 2008. Hierarchical Modeling and Inference in Ecology. Academic Press, San Diego.

15. Kéry, M., J.A. Royle, M. Plattner, and R.M. Dorazio. 2009. Species richness and occupancy estimation in communities subject to temporary emigration. Ecology 90: 1279–1290.

16. Dorazio, R.M. 2009. On selecting a prior for the precision parameter of Dirichlet process mixture models. Journal of Statistical Planning and Inference 139: 3384–3390.

17. Kéry, M., R.M. Dorazio, L. Soldaat, A. van Strien, A. Zuiderwijk,and J.A. Royle. 2009. Trend estimation in populations with imperfect detection. Journal of Applied Ecology 46: 1163–1172.

18. Rota, C. T., R.J. Fletcher Jr., R.M. Dorazio, and M.G. Betts. 2009. Occupancy estimation and the closure assumption. Journal of Applied Ecology 46: 1173–1181.

19. Waddle, J.H., R.M. Dorazio, S.C. Walls, K.G. Rice, J. Beauchamp, M.J. Schuman, and F.J. Mazzotti. 2010. A new parameterization for estimating co-occurrence of interacting species. Ecological Applications 20: 1467-1475.

20. Dorazio, R.M., M. Kéry, J.A. Royle, and M. Plattner. 2010. Models for inference in dynamic metacommunity systems. Ecology 91: 2466–2475.

21. Gotelli, N.J., R.M. Dorazio, A.M. Ellison, and G.D. Grossman. 2010. Detecting temporal trends in species assemblages with bootstrapping procedures and hierarchical models. Philosophical Transactions of the Royal Society, Series B 365: 3621–3631.

22. Fujisaki, I., F.J. Mazzotti, R.M. Dorazio, K.G. Rice, M. Cherkiss, and B. Jeffery. 2011. Estimating trend in alligator populations from nightlight survey data. Wetlands 31: 147–155.

23. Dorazio, R.M., N.J. Gotelli, and A.M. Ellison. 2011. Modern methods of estimating biodiversity from presence-absence surveys. In Biodiversity Loss in a Changing Planet, O. Grillo and G. Venora (eds.), InTech, ISBN 978-953-307-707-9, Available from: `http://www.intechopen.com/articles/show/title/modern-methods-of-estimating-biodiversity-from-presence-absence-surveys`

24. Miller, M.W, E.V. Pearlstine, R.M. Dorazio, and F.J. Mazzotti. 2011. Occupancy and abundance of wintering birds in a dynamic agricultural landscape. Journal of Wildlife Management 75: 836–847.

25. Langtimm, C.A., R.M. Dorazio, B.M. Stith, and T.J. Doyle. 2011. New aerial survey and hierarchical model to estimate manatee abundance. Journal of Wildlife Management 75: 399–412.

26. Walls, S.C., J.H. Waddle, and R.M. Dorazio. 2011. Estimating occupancy dynamics in an anuran assemblage from Louisiana, USA. Journal of Wildlife Management 75: 751–761.

27. Oliveira-Santos, L.G.R., R.M. Dorazio, W.M. Tomas, G. Mourão, and F.A.S. Fernandez. 2011. No evidence of interference competition among the invasive feral pig and two native peccary species in a neotropical wetland. Journal of Tropical Ecology 27: 557–561.

28. Royle, J.A. and R.M. Dorazio. 2012. Parameter-expanded data augmentation for Bayesian analysis of capture-recapture models. Journal of Ornithology 152 (Supplement 2): S521–S537.

29. Shirley, M.H., R.M. Dorazio, E. Abassery, A. Elhady, M.S. Mekki, and H.H. Asran. 2012. A sampling design and model for estimating abundance of Nile crocodiles while accounting for heterogeneity of detectability of multiple observers. Journal of Wildlife Management 76: 966–975.

30. Pacifici, K., R.M. Dorazio, and M.J. Conroy. 2012. A two-phase sampling design for increasing detections of rare species in occupancy surveys. Methods in Ecology and Evolution 3: 721–730.

31. Dorazio, R.M. 2012. Predicting the geographic distribution of a species from presence-only data subject to detection errors. Biometrics 68: 1303–1312.

32. Dorazio, R.M. and D. Taylor Rodríguez. 2012. A Gibbs sampler for Bayesian analysis of site-occupancy data. Methods in Ecology and Evolution 3: 1093–1098.

33. Dorazio, R.M., J. Martin, and H.H. Edwards. 2013. Estimating abundance while accounting for rarity, correlated behavior of animals, and other sources of variation in counts. Ecology 94: 1472–1478.

34. Hua, F., R.J. Fletcher Jr., K.E. Sieving, and R.M. Dorazio. 2013. Too risky to settle: avian community structure changes in response to perceived predation risk on adults and offspring. Proceedings of the Royal Society B 280: 20130762.

Curriculum vitae
Brian R. Gray
August 2013

Upper Mississippi Environmental Sciences Center
US Geological Survey
La Crosse, WI 54603
Phone: 608-781-6234, fax: 608-783-6066, email: brgray@usgs.gov
Web: http://www.umesc.usgs.gov/staff/bios/brg0.html

Education

Ph.D., Biostatistics, University of South Carolina, Columbia, SC, 2001
Dissertation: Modeling nonstationary and spatially-correlated oyster infection prevalence data
M.S., Biology, University of Kentucky, Lexington, KY, 1993
Thesis: Heavy metal sorption by stream periphytic surfaces
B.A., Theology, Ambassador University, Pasadena, CA, 1987
Diploma in Natural Resources, Lincoln College, New Zealand, 1982
B.Sc., Botany, University of Auckland, Auckland, New Zealand, 1981

Positions

Statistician, Upper Midwest Environmental Sciences Center, US Geological Survey, 2001-present. Develop and publish methods for analysis of ecological and environmental data; consult on design and analytical questions; statistician for US Army Corps of Engineers' Long Term Resource Monitoring Program (for the Upper Mississippi and Illinois Rivers).

Biostatistician, Schools of Medicine and Public Health, and Baruch Institute for Marine Biology and Coastal Ecology, University of South Carolina, 1997-2001 (part-time). Modeled spatially- and spatiotemporally-correlated ecological outcomes as functions of land use and environmental variables; statistical consultant for students and staff.

Sediment toxicologist, AScI Corporation, U.S. Army Corps of Engineers' Waterways Experiment Station, Vicksburg, MS, 1993-1997. Primary technical writer and data analyst for sediment toxicity group; led acute, sub-chronic and chronic tests with freshwater, estuarine and marine macroinvertebrates; developed method of selecting cost- and information-efficient measures of toxicity endpoints (Gray et al. 1998); supervised technical work of up to 8 staff.

Graduate assistantships, University of Kentucky, and Oak Ridge National Laboratory,1991-1993. Led and participated in stream biomonitoring (macroinvertebrates and fish) programs.

Botanist, Chambers Group, Santa Ana, CA, 1990 (part time).
Magazine circulation analyst, *Plain Truth* magazine, Pasadena, CA, 1987-1990.

Assistant data processing manager, Ambassador College, Auckland, New Zealand, 1985-1986.
Land planning assistant, Department of Lands and Survey, Christchurch, NZ, 1981-1982. Researched and wrote environmental assessment of recreation effects on an 800-acre national wetland; coauthored land management plan for national recreation reserve.

Publications
Peer reviewed papers

Gray BR, JT Rogala, JN Houser. 2013. Treating floodplain lakes of large rivers as study units for variables that vary within lakes; an evaluation using chlorophyll *a* and inorganic suspended solids data from floodplain lakes of the Upper Mississippi River. River Research and Applications 29: 330–342.

Gray BR, MD Holland, F Yi, LAH Starcevich. 2013. Influences of availability on parameter estimates from site occupancy models, with application to submersed aquatic vegetation. Natural Resource Modeling (http://onlinelibrary.wiley.com/doi/10.1111/nrm.12012/pdf).

Kirsch EM, PJ Heglund, BR Gray, P McKann. 2013. Songbird use of floodplain and upland forests along the upper Mississippi River corridor during spring migration. Condor 115: 115-130.

McKann PC, BR Gray, WE Thogmartin. 2013. Small sample bias of dynamic occupancy models. J Wildlife Management and Wildlife Monographs 77: 172-180.

BR Gray, AM Ray, JT Rogala, MD Holland, JD Houser. 2012. Spatial and temporal variation in duckweed and filamentous algal levels in contiguous floodplain lakes of the Upper Mississippi River. J Aquatic Plant Management 50: 91-100.

Smith DR, JT Rogala, BR Gray, S Zigler, TJ Newton. 2011. Evaluation of sampling designs for estimation of density and abundance of freshwater mussels in the Upper Mississippi River. River Research and Applications 27: 122–133.

Newton TJ, SJ Zigler, JT Rogala, BR Gray, M Davis. 2011. Population assessment and potential functional roles of native mussels in the Upper Mississippi River. Aquatic Conservation: Marine and Freshwater Ecosystems 21: 122–131.

Nielson RM, BR Gray, LL McDonald, PJ Heglund. 2011. Estimating site occupancy rates for aquatic plants using spatial sub-sampling designs when detection probabilities are less than one. Aquatic Botany 95: 221– 225.

Kenow KP, MW Meyer, R Rossmann, A Gendron-Fitzpatrick, BR Gray. 2011. Effects of injected methylmercury on hatch success of common loon (*Gavia immer*) eggs. Ecotoxicology 20: 1684-1693.

Toribio SG, BR Gray, S Liang. 2011. An evaluation of the Bayesian approach for fitting the N-mixture model for use with pseudo-replicated count data. J Statistical Computation and Simulation 82: 1135-1143.

Gray, BR, RJ Haro, JT Rogala. 2010. Addressing among-group variation in covariate effects using multilevel models. Environmental and Ecological Statistics 17: 573–591.

Custer, TW, CM Custer, BR Gray. 2010. Polychlorinated biphenyls, dioxins, furans, and organochlorine pesticides in belted kingfisher eggs from the upper Hudson River basin, New York. Environmental Toxicology and Chemistry 29: 99-110.

Custer TW, CM Custer, BR Gray. 2010. Polychlorinated biphenyls, dioxins, furans, and organochlorine pesticides in spotted sandpiper eggs from the upper Hudson River basin, New York. Ecotoxicology 19:391-404.

Custer CM, BR Gray, TW Custer. 2010. Effects of egg order on organic and inorganic element concentrations and egg characteristics in tree swallows, *Tachycineta bicolor*. Environmental Toxicology and Chemistry 29: 909–921.

Holland MD, G Meeden, BR Gray. 2010. A finite population Bayes procedure for censored categorical abundance data. J Indian Society of Agricultural Statistics 64: 171-175.

Holland MD, BR Gray. 2011. Multinomial mixture model with heterogeneous classification probabilities. Environmental and Ecological Statistics 18: 257–270.

Gray BR, W Shi, JN Houser, JT Rogala, Z Guan, JL Cochran. 2010. Cumulative effects of restoration efforts on ecological characteristics of an open water area within the Upper Mississippi River. River Research and Applications 27: 537-549.

Kenow KP, RK Hines, MW Meyer, SA Suarez, BR Gray. 2010. Effects of methylmercury exposure on the behavior of captive-reared common loon (*Gavia immer*) chicks. Ecotoxicology 19: 933-944.

Smith DR, BR Gray, TJ Newton, D Nichols. 2009. Effect of imperfect detectability on adaptive and conventional sampling: simulated sampling of freshwater mussels in the Upper Mississippi River. Environmental Monitoring and Assessment 170: 499-507.

Gray BR, D Bushek, JW Drane, D Porter. 2009. Associations between land use and *Perkinsus marinus* infection of eastern oysters in a high salinity, partially urbanized estuary. Ecotoxicology 18: 259-269.

McCain KNS, RA Hrabik, VA Barko, BR Gray, JR Bidwell. 2009. An evaluation of invertebrate sampling methods for use in the Open River reach of the Upper Mississippi River. MDC Resource Science 4: 1-3.

Li J, BR Gray, DM Bates. 2008. An empirical study of statistical properties of variance partition coefficients for multi-level logistic regression models. Communications in Statistics – Simulation and Computation 37: 2010-2026.

Kenow KP, KA Grasman, RK Hines, MW Meyer, A Gendron-Fitzpatrick, MG Spalding, BR Gray. 2007. Effects of methylmercury exposure on the immune function of juvenile common loons. Environmental Toxicology and Chemistry 26:1460-1469.

Langrehr HA, BR Gray, JA Janvrin. 2007. Evaluation of aquatic macrophyte community response to island construction in the Upper Mississippi River. Lake and Reservoir Management 23: 313-320.

Knutson MG, BR Gray, MS Meier. 2007. Comparing the effects of local, landscape, and temporal factors on forest bird nest survival using logistic-exposure models. Studies in Avian Biology 34: 105-116.

Gray BR, MM Burlew. 2007. Algorithms for estimating power to detect trends across grouped count data. Ecology 88: 2364-2372.

Kirsch EM, BR Gray, T Fox, WE Thogmartin. 2007. Breeding bird territory placement in riparian wet meadows in relation to invasive reed canary grass, *Phalaris arundinacea*. Wetlands 27: 644-655.

Thogmartin, WE, BR Gray, M Gallagher, N Young, JJ Rohweder, MG Knutson. 2007. Power to detect trend in short-term time series of bird abundance. Condor 109:943–948.

Bly BL, MG Knutson, MB Sandheinrich, BR Gray, DA Jobe. 2006. Flow cytometry used to assess genetic damage in frogs from farm ponds. J Iowa Academy Science 111: 45-48.

Gray BR. 2005. Selecting a distributional assumption for modelling relative abundances of benthic macroinvertebrates. Ecological Modelling 185: 1-12.

Gray BR, RJ Haro, JT Rogala, JS Sauer. 2005. Modeling fingernail clam (Family: Sphaeriidae) abundance-habitat associations at two spatial scales using hierarchical count models. J Freshwater Biology 50: 715-729.

Custer TW, E Cox, BR Gray. 2004. Trace elements in moose (*Alces alces*) from northwestern Minnesota, USA. Science of the Total Environment 330: 81-87.

Knutson MG, WB Richardson, DM Reineke, BR Gray, JR Parmelee, SE Weick. 2004. Agricultural ponds support amphibian populations. Ecological Applications 14: 669-684.

Gray BR, WR Hill, AJ Stewart. 2001. Effects of development time, biomass and ferromanganese oxides on nickel sorption by stream periphyton. Environmental Pollution 112: 61-71.

Gray BR, S McDermott, S Butkus. 2000. Effect of job coaches on employment likelihood for individuals with mental retardation in South Carolina. J Vocational Research 14: 5-11.

Gray BR, VL Emery, DL Brandon and others. 1998. Selection of optimal measures of growth and reproduction for the sublethal *Leptocheirus plumulosus* sediment bioassay. Environmental

Toxicology and Chemistry 17: 2288-2297.

Emery VL, DW Moore, BR Gray, BM Duke, AB Gibson, RW Wright, JD Farrar. 1997. Development of a chronic sublethal sediment bioassay using the estuarine amphipod *Leptocheirus plumulosus* (Shoemaker). Environmental Toxicology and Chemistry 16: 1912-1920.

Moore DW, TS Bridges, BR Gray, BM Duke. 1997. Risk of ammonia toxicity during sediment bioassays with the estuarine amphipod *Leptocheirus plumulosus*. Environmental Toxicology and Chemistry 16: 1020-1027.

Bridges TS, RB Wright, BR Gray, AB Gibson, TM Dillon. 1996. Chronic toxicity of Great Lakes sediments to *Daphnia magna*: elutriate effects on survival, reproduction, and population growth. Ecotoxicology 5: 83-102.

Gray BR, WR Hill. 1995. Nickel sorption by periphyton exposed to different light intensities. J North American Benthological Society 14: 299-305.

Papers accepted for publication
Houser JN, SM Giblin, WF James, HA Langrehr, JT Rogala, JF Sullivan, BR Gray. Nutrient cycling and the abundance of duckweed and filamentous algae in backwater lakes of the Upper Mississippi River. River Systems.

Papers in journal review
Kirsch EM, BR Gray, S Toribio. Breeding bird assemblage shifts associated with invasive *Phalaris arundinacea* and floodplain forest habitat structure on the Upper Mississippi River. American Midland Naturalist.

King RS, PC Mckann, BR Gray, PH Adler, MS Putnam. Black fly harassment and nesting crane behaviors: a case study in host-haematophagous fly interactions. Avian Ecology.

Rogala JT, BR Gray, JN Houser, JC Biederman. Recent trends in among- and within-lake water movement of floodplain lakes in the Upper Mississippi River. Regulated Rivers.

Refereed book chapters
Gray BR. 2011. Variance components estimation for continuous and discrete data, with emphasis on cross-classified sampling designs. In Gitzen RA, JJ Millspaugh, AB Cooper, DS Licht (eds.), Design and analysis of long-term ecological monitoring studies, Cambridge, Cambridge, UK, pp. 200-227.

Reports
Reports to US Army Corps of Engineers on environmental and/or ecological issues (and mostly subsumed in subsequent publications): 10.

Russell M, BR Gray. 2013. Markov chains and zeros in my data: Bayesian approaches in SAS® that address zero-inflation in count data. In Proceedings of the SAS Global Forum 2013

Conference, paper 450-2013, SAS Institute, Cary, NC. Accessible at http://support.sas.com/resources/papers/proceedings13/450-2013.pdf.

Kenow KP, BR Gray, PJ Boma, SC Houdek, L Fara, M Suarez. 2012. Annual Report: Boater Compliance With The Lake Onalaska Voluntary Waterfowl Avoidance Area - Fall 2011. Submitted in fulfillment of the Scope of Work entitled "Boater Compliance with the Lake Onalaska Voluntary Waterfowl Avoidance Area - Fall 2011"; U.S. Fish and Wildlife Service, Upper Mississippi River National Wildlife and Fish Refuge – La Crosse District (Agreement No. F11RG00339; 29 June 2011), 12 September 2012.

Kenow KP, BR Gray, P Boma. 2010. Letter Report: Human disturbance and biotic response to island restoration in the Wisconsin Islands closed area on the Upper Mississippi River, Fall 2009. Letter report TS-08-B2K5C (DMM4K) to US Fish and Wildlife Service.

King R, P Adler, S Converse, BR Gray, K Maguire, M Meier, M Putnam. 2010. Whooping crane site selection and factors limiting whooping crane nest success in central Wisconsin. US Fish and Wildlife Service.

Kenow KP, L Robinson, BR Gray, P Boma. 2009. Human disturbance and biotic response to island restoration in the Wisconsin Islands closed area on the Upper Mississippi River. Briefing report TS-08-B2K5C (DMM4E) to US Fish and Wildlife Service.

Kenow KP, L Robinson, BR Gray, P Boma. 2008. Human disturbance and biotic response to island restoration in the Wisconsin Islands closed area on the Upper Mississippi River - pilot study. Draft briefing report TS-08-B2K5C to US Fish and Wildlife Service.

Knutson MG, N Danz, T Sutherland, BR Gray. 2008. Landbird monitoring protocol for the U.S. Fish and Wildlife Service, Midwest and Northeast Regions, Version 1. Biological Monitoring Team Technical Report BMT-2008-01. U.S. Fish and Wildlife Service, La Crosse, WI.

Thogmartin WE, MG Knutson, JJ Rohweder, BR Gray. 2006. Bird habitat associations on the lower Missouri River floodplain: A report to the U.S. Fish and Wildlife Service Big Muddy National Wildlife and Fish Refuge: La Crosse, WI, Upper Midwest Environmental Sciences Center, 123 pages.

Rogala JT, PJ Boma, BR Gray. 2003. Rates and patterns of net sedimentation in backwaters of Pools 4, 8, and 13 of the Upper Mississippi River. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin. An LTRMP Web-based report available online at www.umesc.usgs.gov/data_library/sedimentation/documents/ rates_patterns/.

Moore DW, AB Gibson, TM Dillon, TS Bridges, EW Gamble, BR Gray, RB Wright, LH Baggett. 1994. Evaluation of proposed U. S. Environmental Protection Agency dredged material bioassays using Great Lakes sediments. Misc. paper EL-94-11, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Commissioner of Crown Lands. 1986. Akaroa Head Reserve management plan. Department of Lands and Survey, Private Bag, Christchurch, New Zealand.

Presentations

Invited presentations

2013. Regression estimation of trends in temperature when time and date of sampling are haphazard (with V Lyubchich, Y Gel). Annual meeting, Statistical Society of Canada, Edmonton, AB.

2013. Properties of slope estimators associated with random slope models (with V Lyubchich, Y Gel). Joint Statistical Meetings, Montreal.

2011. Using clustered data to elaborate study inferences. US Geological Survey Water Science Center, Middleton, WI. March 16, 2011.

2008. Estimating parameter values from observational data. Workshop on ecosystem dysfunction and fish health, Great Lakes Fishery Commission, Ann Arbor, MI.

2007. Estimating status and trends using LTRMP survey data. Environmental Management Program Coordinating Committee of the Upper Mississippi River.

2005. Challenges to melding design- and model-based inferences for a river monitoring program. Joint Statistical Meetings, Minneapolis, MN.

2005. Monitoring, statistics, NESP and the LTRMP. Monitoring Team of the NESP (Navigation and Ecosystem Sustainability Program, Upper Mississippi River) Science Panel, La Crosse, WI.

2004. Using linear models of log-transformed count means when sample sizes vary. Center for Integrating Statistics and Environmental Science, University of Chicago.

Non-invited presentations at professional meetings: approx. 65

Reviewing

Editorial board membership

Environmental Toxicology and Chemistry, 2002-2004.

Manuscript refereeing

Auk; Canadian J Zoology; Diseases of Aquatic Organisms; Ecology; Ecosphere; Ecotoxicology; Environmental and Ecological Statistics; Environmental Toxicology and Chemistry; Frontiers in Ecology; J Agricultural, Environmental and Agricultural Statistics; Freshwater Biology; J Animal Ecology; J Agricultural, Biological, and Environmental Statistics; J Applied Ecology; J Wildlife Management; Methods Ecology Evolution; River Research and Applications; Sustainability; Wildlife Society Bulletin; Wilson Journal of Ornithology.

Proposal reviewer
National Science Foundation, 2006; National Wildlife Health Center, 2005; Patuxent Wildlife Center, 2005; USEPA Environmental Monitoring and Assessment Program, 2003.

Expert consultant
Hudson River Natural Resource Damage Assessment, US Fish & Wildlife Service, 2004, 2005; Oregon Water Science Center, 2007; Region 3, US Fish and Wildlife Service, 2007 - present.

Service

Secretary, Section on Environment and Statistics, American Statistical Association, 2011-2014
North American representative, The International Environmetrics Society (TIES), 2009-2013
Organizer, North American regional meeting, TIES, La Crosse, WI, 2009
Lead and principal author, LTRMP sampling design and statistics web pages, http://www.umesc.usgs.gov/ltrmp/stats/statistics.html
UMESC representative, USFWS Great Lakes Basin Ecosystem Team, 2002-2005.

Training (selected)

Introduction to ecological risk assessment (SM Bartell), Waterways Experiment Station, Vicksburg, MS, 6-8 March, 1995
Ecological risk assessment (Suter G II, L Barnthouse, S Norton), SETAC annual meeting, 1992

Grants and awards

Gray BR. 2009. Estimating submersed aquatic vegetation levels in rivers, lakes and estuaries of the United States using rake data. USGS burden dollars. $15,000.

Rogala J, T Newton, BR Gray, S Zigler, D Smith, M Davis. 2008. Development of survey methods to spatially map mussel assemblages in the UMRS. US Army Corps of Engineers. $46,766.

Sauer JS, R Cole, G Sandland, RJ Haro, BR Gray, S Westenbroek. 2008. Understanding mortality of waterbirds caused by the dynamics of disease-carrying exotic snails in the Upper Mississippi River. US Geological Survey Midwest Area Science Funds. $60,000.

Zigler S, T Newton, BR Gray, J Rogala. 2008. Statistical and geospatial analyses of mussel communities in the UMR. US Army Corps of Engineers. $57,633.

Newton TN, BR Gray, D Smith, S Zigler. 2007. Development of sampling designs for estimating mussel abundances associated with HREPs. US Army Corps of Engineers. $101,000.

Gray BR. 2007. Cumulative HREP effects on ecological characteristics of impounded regions of the Upper Mississippi River. US Army Corps of Engineers. $38,117.

Gray BR, T Newton. 2006. Comparison of clustered and adaptive sampling designs for estimating abundance of freshwater macroinvertebrates (native mussels, zebra mussels and soft-sediment macroinvertebrates). UMESC Director's Funds. $19,206.

Gray BR. 2006. Model chlorophyll *a* and suspended solids levels in backwater lakes of the UMRS, Part II: Importance of backwater lakes, backwater lake-covariate associations, and long-term trends in backwater variability. Additional Program Elements, Long Term Resource Monitoring Program, US Army Corps of Engineers. $26,123.

Deppa B, BR Gray, PH Heglund. 2006. Assessment of the rake method for the estimation of submersed aquatic vegetation levels. Additional Program Elements, Long Term Resource Monitoring Program, US Army Corps of Engineers. $43,221.

Gray BR. 2005. Develop control charts for selected water quality constituents. Additional Program Elements, Long Term Resource Monitoring Program, US Army Corps of Engineers. $19,294.

Gray BR. 2005. Model chlorophyll *a* and suspended solids levels in backwater lakes of the UMRS. Additional Program Elements, Long Term Resource Monitoring Program, US Army Corps of Engineers. $26,469.

Knutson MG, TJ Fox, EM Kirsch, BR Gray and others. 2001. Science Support for Regional and Refuge Bird Conservation Planning. $70,000.

Travel awards, Graduate School and School of Public Health, USC, 1999 and 2000. $650.
Grants-in-Aid of Research award, Sigma Xi Scientific Research Society, 1992. $375.
Oak Ridge Associated Universities Graduate Student Research Participation Program fellowship award, 1992-1993.
'A' bursary award (stipend, tuition waiver at NZ university), NZ government, 1977-1980.

Curriculum Vitae (abbreviated)

JENNIFER A. HOETING

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Colorado State University jah@rams.colostate.edu
Fort Collins, CO 80523-1877 www.stat.colostate.edu/~jah

Education

Ph.D.	Statistics, University of Washington, 1994
M.S.	Statistics, University of Washington, 1991
B.S. with distinction	Statistics and Psychology, University of Michigan, 1988

Experience

1994–present	Department of Statistics, Colorado State University Professor, Associate Professor, and Assistant Professor
2013–2014	Interim Department Chair, Department of Statistics, Colorado State University
2012–2013	Faculty Search/Equal Opportunity Coordinator, College of Natural Sciences, Colorado State University
2009–2010	Visiting Scientist, Commonwealth Scientific and Industrial Research Organisation CSIRO Division of Mathematics, Informatics and Statistics, Brisbane, Australia
2003	Visiting Professor, University of Otago, Department of Mathematics and Statistics Dunedin, New Zealand (7 months)

Honors

Fellow of the American Statistical Association

American Statistical Association, Section on Statistics and the Environment, 2013, Second place in Student Paper Competition for Sun, L., Lee, C., and Hoeting, J. "Penalized Importance Sampling for Parameter Estimation in Stochastic Differential Equations in two Chronic Wasting Disease Epidemics."

Colorado State University Alumni Association Best Teacher Award nominee, nominated by former students, 1999 and 2009

Outstanding Science Mentor Award, Students as Leaders in Science, Colorado State University, 2008

Colorado State University College of Natural Sciences Faculty Undergraduate Teaching Award, 2001-2002

Women in Science Initiative award to recruit women to graduate programs in the sciences, University of North Carolina, Greensboro, Fall 1999

National Science Foundation Academe/Industry Collaboration, Invited Member, 1995–1997

University of Michigan Honor Roll, 1984–1988; Honors College, 1984–1986

University of Michigan Alumni Scholarship for Excellence, 1984

Publications

Publications: Book

Givens, Geof H. and Jennifer A. Hoeting (2013). *Computational Statistics*, Second Edition, John Wiley & Sons, New York, 469 pages. Book website with code and examples: `www.stat.colostate.edu/computationalstatistics/`

Publications: Peer Reviewed

1. Geremia, C., N. T. Hobbs, J. A. Hoeting, P. J. White, R. L. Wallen, R.G. R. Watson, D. Blanton (2013) Integrating Population and Individual Level Information in a Movement Model of Yellowstone Bison, to appear *Ecological Applications*.
2. Schliep, Erin M. and J. A. Hoeting (2013). Multivariate multilevel latent Gaussian process model to evaluate wetland condition, to appear *Journal of Agricultural, Biological, and Environmental Statistics (JABES)*, DOI 10.1007/s13253-013-0136-z.
3. K. M. Pepin, J. Wang, C. T. Webb, J. A. Hoeting, M. Poss, P. J. Hudson, W. Hong, H. Zhu, Y. Guan, S. Riley (2013) Anticipating the incidence of avian influenza subtypes H9 and H5 in live-bird markets, *PLoS One*, 8:2, e56157.
4. Burch, N., J. A. Hoeting, D. Estep (2012). Optimal design and directional leverage with applications in differential equation models. *Metrika*, 75:7, 895:911.
5. Williams, M. S., E. C. Ebel, J. A. Hoeting, and J. L. Withee (2012). A Bayesian Approach for Calibrating Risk Assessment Models. *Novel Approaches and their Applications in Risk Assessment*. (Yuzhou Luo, editor). InTech, p 297-316.
6. Meyer, M. C., A. Hackstadt, and J. A. Hoeting (2011). Bayesian Estimation and Inference for Generalized Partial Linear Models Using Shape-Restricted Splines. Journal of Nonparametric Statistics, **23:4**, 867-884.
7. Johnson, D. S. and J. A. Hoeting (2011). Bayesian Multimodel Inference for Spatial Regression Models. *PLoS ONE* 6(11): e25677. doi:10.1371/journal.pone.0025677.
8. Williams, M. S., E. D. Ebel, J. A. Hoeting (2011) "Bayesian Analysis for Food-Safety Risk Assessment: Evaluation of Dose-Response Functions within WinBUGS" *Journal of Statistical Software*, Vol 43, Code Snippet 2.
9. Johnson, D. S. and J. A. Hoeting (2011). Properties of Graphical Regression Models for Multidimensional Categorical Data, *Statistics and Probability Letters*. **81**, 1471-1475.
10. Merrill, S. C., S. Walter, F. B. Peairs, and J. A. Hoeting (2011). Spatial Variability of Western Bean Cutworm (Lepidoptera: Noctuidae) Pheromone Trap Captures in Sprinkler Irrigated Corn in Eastern Colorado. *Environmental Entomology*, 40(3):654-600.
11. Higgs, M. D., J. A. Hoeting (2010). A Clipped Latent-Variable Model for Spatially Correlated Ordered Categorical Data. *Computational Statistics and Data Analysis*. 54:8, 1999-2011.
12. McClintock, B. T., J. A. Hoeting (2010). Bayesian analysis of abundance for binomial sighting data with unknown number of marked individuals. *Environmental and Ecological Statistics*, 17:317-332.
13. Schmidt, A., J. A. Hoeting, J. B. M. Pereira, P. P. Vieira (2010). Mapping Malaria in the Amazon Rain Forest: a Spatio-Temporal Mixture Model. In *The Handbook of Bayesian Analysis*
14. Schliep, E. M., D. Cooley, S. R. Sain, J. A. Hoeting (2010). A Comparison Study of Extreme Precipitation from Six Different Regional Climate Models via Spatial Hierarchical Modeling. *Extremes*, 13:219–239.
15. Webb, C.T., J. A. Hoeting. G. M. Ames, M. I. Pyne, N. L. Poff (2010). A structured and dynamic framework to advance traits-based theory and prediction in ecology. *Ecology Letters*, 13: 267-283.
16. Givens, G. H., J. A. Hoeting, and L. Beri (2010). Factors that Influence Aerial Line Transect Detection of Bering-Chukchi-Beaufort Seas Bowhead Whales. *Journal of Cetacean Research and Management*, 11(1): 9-16.
17. Irvine, K, A. I. Gitelman, J. A. Hoeting (2007). Spatial Designs and Properties of Spatial Correlation: Effects on Covariance Estimation. *Journal of Agricultural, Biological and Environmental Statistics*, 12:4, 450–469.
18. Farnsworth, M. L., J. A. Hoeting, N. T. Hobbs, M. M. Conner, K. P. Burnham, L. L. Wolfe, E. S. Williams, D. M. Theobald, M. W. Miller (2007). The Role of Geographic Information Systems in Wildlife Landscape Epidemiology: Models of Chronic Wasting Disease in Colorado Mule Deer. Veterinaria Italiana, 43:3, 571–580.

19. Johnson, D. S., J. A. Hoeting and N. L. Poff (2006). Biological monitoring: A Bayesian Model for Multivariate Compositional Data. In *Bayesian Statistics and its Applications* (S. K. Upadhyay, U. Singh and D. K. Dey, editors), Anamaya publishers: New Delhi, p 270–289.

20. Hoeting, J. A., R. A. Davis, A. A. Merton, and S. E. Thompson (2006). Model Selection for Geostatistical Models. *Ecological Applications*, 16(1), 87–98.

21. Farnsworth, M. L., J. A. Hoeting, N. T. Hobbs, M. W. Miller (2006). Linking Mule Deer Movement Scales to the Spatial Distribution of Chronic Wasting Disease: A Hierarchical Bayesian Approach. *Ecological Applications*, 16(3), 1026–1036.

22. Reese, G. C., K. R. Wilson, J. A. Hoeting, C. H. Flather (2005). Factors affecting Species Distribution Predictions: A Simulation Modeling Experiment. *Ecological Applications*, 15:2, 554–564.

23. Hoeting, J. A., R. L. Tweedie and C. S. Olver (2003). Transform Estimation of Parameters for Stage-Frequency Data. *Journal of the American Statistical Association*, 98:463, 503–514.

24. Johnson, D. S. and J. A. Hoeting (2003). Autoregressive Models for Capture-Recapture Data: A Bayesian Approach. *Biometrics*, 59:340–349.

25. Hoeting, J. A., A. E. Raftery, and D. Madigan (2002). Bayesian Variable and Transformation Selection in Linear Regression. *Journal of Computational and Graphical Statistics*, **11**:3, 485–507.

26. Heermann, D.F., J. A. Hoeting, S. E. Thompson, H. R. Duke, D. G. Westfall, G. W. Buchleiter, P. Westra, F. B. Peairs, and K. F. Fleming (2002). Interdisciplinary Irrigated Precision Farming Research. *Precision Agriculture*, **3**, 47–61.

27. Hoeting, J. A., M. Leecaster, and D. Bowden (2000). An Improved Model for Spatially Correlated Binary Responses. *Journal of Agricultural, Biological, and Environmental Statistics*, **5**:1, 102–114.

28. Heermann, D.F., J. A. Hoeting, *et al.* (2000). Irrigated Precision Farming for Corn Production. In *Proc. of the Second International Conference on Geospatial Information in Agriculture and Forestry*, Lake Buena Vista, Florida, p. I-144–I-151.

29. Hoeting, J. A., D. Madigan, A. E. Raftery, and C. T. Volinsky (1999). Bayesian Model Averaging: A Tutorial (with discussion). *Statistical Science*, **14**:4, 382–417.

30. Heermann, D.F., J. A. Hoeting, *et al.* (1999). Interdisciplinary Irrigated Precision Farming Team Research. In *Proc. of 2nd European Conf. on Precision Agriculture* (J.V. Stafford, editor), 121–130.

31. Hoeting, J. A. and J. G. Ibrahim (1998). Bayesian Predictive Simultaneous Variable and Transformation Selection in the Linear Model. *Computational Statistics and Data Analysis*, **28**, 87–103.

32. Hoeting, J. A. and A. Olsen (1998). Are the fish safe to eat? Assessing mercury levels in fish in Maine lakes. *Statistical Case Studies: A Collaboration Between Academe and Industry* (R. Peck, L. Haugh, A. Goodman, editors), pages 1–13. ASA-SIAM.

33. Hoeting, J. A. and A. Olsen (1998). Book for students including the chapter "Are the fish safe to eat? Assessing mercury levels in fish in Maine lakes." *Statistical Case Studies: A Collaboration Between Academe and Industry, Student Edition* (R. Peck, L. Haugh, A. Goodman, editors), pages 1–6. ASA-SIAM.

34. Hoeting, J. A. (1998). Sandbars in the Colorado River: an Environmental Consulting Project. *Statistical Science*, **13**, 9–13.

35. Raftery, A.E., D. Madigan, and J. A. Hoeting (1997). Bayesian Model Averaging for Linear Regression Models. *Journal of the American Statistical Association*, **92**, 179–191.

36. Hoeting, J. A., D. Madigan, and A. E. Raftery (1996). A Method for Simultaneous Variable Selection and Outlier Identification in Linear Regression. *Computational Statistics and Data Analysis*, **22**, 251–270.

37. Madigan, D., A. E. Raftery, C. T. Volinsky, and J. A. Hoeting (1996). Bayesian Model Averaging. *Integrating Multiple Learned Models (IMLM-96)*, (P. Chan, S. Stolfo, and D. Wolpert, editors), 77–83.

Publications: Invited Comments, Invited White Papers, and Book Reviews

L. Wang and J. A. Hoeting (2013) Discussion of "How to find an appropriate clustering for mixed type variables with application to socio-economic stratification" by Christian Hennig and Tim F. Liao *Journal of the Royal Statistical Society Series C.* **62:3**,1-25.

D. Cooley and J. A. Hoeting (2011) Discussion of "An explicit link between Gaussian fields and Gaussian Markov random fields: the stochastic partial differential equation approach" by F. Lindgren, H. Rue, and J. Lindstrom. *Journal of the Royal Statistical Society B.* **73:4**,470.

K. Ogle, J. A. Hoeting, N. Cressie, R. Smith, S. Lele, R. McRoberts, L. Stefanski, G. Ziv (2011) White paper: "Measuring, Monitoring, and Forecasting Progress toward Sustainability," in Mathematical and Statistical Challenges for Sustainability. A report of a National Science Foundation Workshop held November 15–17, 2010. p 102-118.

Hoeting, J.A. (2009). The Importance of Accounting for Spatial and Temporal Correlation in Analyses of Ecological Data. *Ecological Applications*, 19:3, 574–577.

Hoeting, J. A. (2006). Some Perspectives on Modeling Species Distributions. Discussion of article by A. E. Gelfand, J. A. Silander, S. Wu, A. Latimer, P. O. Lewis, A. G. Rebelo, M. Holder. *Bayesian Analysis*, 1:1, 93–98.

Hoeting, J. A. (1997). Review of *Statistics and Data Analysis* by Siegel and Morgan, *The American Statistician*, **51**, 93–94.

Publications: Work in progress

Webb, C.T., A. A. Merton, J. A. Hoeting, R. S. Miller, M. L. Farnsworth, S. R. Swafford, T. J. DeLiberto, K. Pedersen, A. B. Franklin, R. G. McLean, K. R. Wilson, P. J. Doherty, Jr. (2012). Predicting Spatio-temporal Dynamics of Avian Influenza in Waterfowl in the United States. Submitted.

Cummings, N.E., J. A. Hoeting, N. T. Hobbs (2013) Bayesian Estimation of the Effective and Basic Reproductive Numbers in a Mark-Recapture Study. Under revision.

Sun, L., C. Lee and J. A. Hoeting (2013) Penalized Importance Sampling for Parameter Estimation in Stochastic Differential Equations, submitted to *Biometrics*.

Publications: Other

Johnson, D. S. and J. A. Hoeting (2003). Random Effects Graphical Models for Multiple Site Sampling Technical Report 2003/15, Department of Statistics, Colorado State University.

Hoeting, J. (2002). Methodology for Bayesian Model Averaging: An Update, In *Proceedings - Manuscripts of invited paper presentations, International Biometric Conference*, Freiburg, Germany, 231-240.

Hoeting, J. A., R. L. Tweedie (2001). Parameter Estimation for Models of Biological Stage-Frequency Data, In *Proceedings of the Graybill Conference*, 2001, 177-210.

Johnson, D.S., J. A. Hoeting, R. L. Tweedie (2001). Empirical Transform Estimation of Parameters in the Monomolecular Growth Model. Technical Report 2001-5, Department of Statistics, Colorado State University.

Young, G., J. A. Hoeting, and B. G. Brown (2000). Applying the Autologistic Function with Covariates to Estimate Aircraft Icing Fields. In *Preprints 15th Conference on Probability and Statistics in the Atmospheric Sciences*, 8-11 May, Asheville, NC, American Meteorological Society (Boston), 50–53.

Hoeting, J. A., M. Van Caster, and D. Bowden (1997). Technical report submitted to the U.S. Forest Service. Included 3 papers: 1. An Improved Model for Spatially Correlated Binary Responses, 2. Sampling Methodology for Detecting Rare Species, 3. Temporal Modeling of Probability of Species Presence.

Hoeting, J. A., K. Varga, and B. Cluer (1997). Predicting Colorado River Sandbar Size Using Glen Canyon Dam Release Characteristics. Technical report for the National Park Service, 54 pp.

Hoeting, J. A. (1994) Accounting for Model Uncertainty in Linear Regression. Ph.D. dissertation, Department of Statistics, University of Washington.

Grants and Contracts

Over $8.7 million in external funding as Sole-PI, PI, or Co-PI, 1995–2013.

Current Grants and Contracts

National Science Foundation $2,500,000
Bayesian Hierarchical Modeling of Disease Dynamics - A Case Example Using Chronic Wasting Disease, Co-PI (PI: N.T. Hobbs, other Co-PIs: M. Miller, S. Tavener, M. Antolin, R. Boone) 01/2009–07/2014.

National Science Foundation $449,978
Long Term Research in Environmental Biology (LTREB): Understanding controls on state-transition on Yellowstone's northern range, Co-PI (PI: N. T. Hobbs, other Co-PIs D. J. Cooper & M. J. Kauffman) 01/01/2012–12/31/2016

U.S. Department of Agriculture, APHIS $236,589
Local cattle movement models, Investigator (PI C.T. Webb), 01/2011–08/2013

Completed Grants and Contracts (PI, Co-PI, or similar)

National Science Foundation $410,550
Landscape Configurations in Yellowstone National Park: An Alternative State Stabilized by Herbivory?, Co-PI (PI: D. Cooper, other Co-PIs: D. Theobald, T. Hobbs, B. Baker) 2007–2011.

U.S. Department of Agriculture, APHIS $141,696
Modeling Avian Influenza, PI with C. Webb, 10/2009-8/2011.

U.S. Environmental Protection Agency $297,818
Basinwide Wetland Profile of the North Platte River Basin in Colorado, Co-PI (PI J. Lemly) 01/01/2009–12/31/2011.

U.S. Department of Agriculture, Food Safety and Inspection Service $19,000
Statistical Support for Chemical and Microbiological Risk Assessments, Sole PI, 9/2009–8/2010.

U.S. Department of Agriculture, APHIS-WS-NWRC $500,000
Avian Influenza Risk Assessment for the United States: Modeling Pathways of Disease Spread by Wild Birds, Member of coordinating committee (similar to a CO-PI), 4/2007–4/2009.

National Science Foundation $3,261,000
IGERT Program in Interdisciplinary Mathematics, Ecology and Statistics (PRIMES), Proposal co-author, 2003–2008.

U.S. Department of Agriculture, Agriculture Research Service $11,669
Zero inflated Poisson models for agricultural data, Principal Investigator, 2007.

Environmental Protection Agency STARMAP: Applying Spatial and Temporal Modeling of Statistical Surveys to Aquatic Resources, Project P.I. for $971,177 (Grant PIs: N.S. Urquhart and R. Davis) 2001–2006.	$3,000,000
U.S. Department of Agriculture, Agriculture Research Service Statistical Modeling for Farming Operations, Principal Investigator, 2001-2006.	$52,540
National Science Foundation New Approaches to Statistical Analysis of Ecological Data: Proposal for a Workshop, Proposal co-author, 2003.	$37,975
National Science Foundation Methodology for Spatial Models for Binary Data, Principal Investigator, 1998–2000.	$75,000
U.S. Department of Agriculture, Agriculture Research Service Statistical Modeling for Farming Operations, Principal Investigator (with R. Davis), 1997–2000.	$115,000
Colorado State University Career Enhancement Grant, Principal Investigator, 1998.	$545
United States Forest Service Surveying and Monitoring Rare Populations, Principal Investigator (with D. Bowden), 1995–7.	$75,000
Thos. Y. Pickett & Company Colorado Property Assessment, Principal Investigator, 1996-7.	$2300
Colorado State University Career Enhancement Grant, Principal Investigator, 1996.	$4900
National Atmospheric Deposition Program The impact of catch efficiency on acid deposition concentrations, Principal Investigator, 1996.	$5000
National Park Service Statistical Analysis of Aerial Photography Data Base from the GCES-II Test Flow Program, Principal Investigator, 1995–6.	$10,650
National Atmospheric Deposition Program Acid Deposition, Principal Investigator, 1995.	$9000
Colorado State University Investing in Instruction, Principal Investigator, 1995.	$1000
Colorado State University Diversity Career Enhancement Grant, A Simultaneous Bayesian Method for Variable Selection, Outlier Identification, and Transformation Selection, Principal Investigator, 1995.	$3800

Presentations and Workshops

Short Courses and Workshops Conducted : 8

Invited and other Lectures : over 70

Teaching

Courses Taught at Colorado State University : 20 different courses

Research Scientist and Pos-doctoral Supervision : 3

Graduate Student Supervision : over 30 PhD and MS students supervised

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EDUCATION, UNIVERSITY, AND DEGREES:

University of California, Berkeley, Ph.D. 1977
Geology
Stanford University, M.S. 1972
Geophysics
Stanford University, B.S. 1970
Geophysics

PROFESSIONAL EXPERIENCE:

October 2009-Current. Principal, Tenaya Water Resources, LLC. Conducting investigations on hydrology and river mechanics, especially river channel changes in response to variations in flow and sediment supply due climate change, land use, and water resources development that have altered aquatic and riparian ecosystems.

October 2009-2013. Research Professor and Fellow, Institute for Arctic and Alpine Research, University of Colorado. Conducting research on the hydrology and climate of polar and alpine regions.

November 1980-July 2009. Chief, River Mechanics Project, National Research Program, USGS, WRD. Conducting research on river mechanics, especially river channel change in response to variations in flow and sediment supply due to climate change, land use, and water resources development.

January 1986-December 1990 and January 1997–January 2002 Research Advisor, Geomorphology and Sediment Group, Responsible for staffing, budget, and scientific excellence for a group of approximately 35 research scientists.

July 1976-November 1980. Project Chief, Colorado District Office, USGS, WRD. Conducted research on sedimentation and reclamation of stream channels in surface mined areas.

March 1975-July 1976. Western Region Staff, USGS, WRD. Conducted research on channel scour and fill, and hydraulic adjustment of a channel to an altered sediment load.

SPECIAL ASSIGNMENTS AND RESPONSIBILITIES:

International Poplar River Water-Quality Board, International Joint Commission, 1978-1980.

Fellow, Institute for Arctic and Alpine Research, University of Colorado, 2009-Current.

Investigator, Joint Japan-United States Project on River Meanders, National Science Foundation, 1985-88.

U.S. Geological Survey Representative, National Academy of Sciences Review Panel for Glen Canyon Environmental Studies, 1985-88.

Expert Witness for the U.S. Government in application for federal reserved water rights for: the four National Forests of Colorado, 1989-91; Zion National Park, 1992-1996, Idaho Wild and Scenic Rivers, 1998-2006.

Expert Witness for the U.S. Government concerning river channel management and regulation under the Clean Water Act (1972), 2011-Current.

Expert Witness for The Republic of India before the Court of Arbitration concerning the operation of a hydroelectric power project located on an Indus River tributrary in the western Himalaya, 2013-Current.

Principal Investigator, Experimental Colorado River Flood through Grand Canyon National Park, 1994-1998.

Science Advisory Committee, U.S. Geological Survey, 1995-1998.

Scientific Advisor, Trinity River Restoration Program, U.S. Bureau of Reclamation, 2003-2008.

PROFESSIONAL SOCIETIES:

Geological Society of America
American Geophysical Union
American Alpine Club

AWARDS AND HONORS:

Certificate of Commendation, Dept. of Justice
Certificate of Merit, U.S. Forest Service
Meritorious Service Award, Department of the Interior

BIBLIOGRAPHY

Andrews, Edmund D., 1973, Review of hydrologic impacts of oil shale mining and processing, in A Scientific and Policy Review of the Prototype Oil Shale Leasing Program: Washington, D.C., Final Environmental Impact Statement of the U.S. Department of the Interior; Fletcher, K. and Baldwin, M. F. (eds.), Institute of Ecology.

1977, Hydraulic adjustment of an alluvial stream channel to the supply of sediment: unpublished Ph.D. Dissertation, University of California, Berkeley, 152 p.

1978, Present and potential sediment yields in the Yampa River basin, Colorado and Wyoming: U.S. Geological Survey Water-Resources Investigations 78-105, 33 p.

1979a, Scour and fill in an alluvial stream channel: U.S. Geological Survey Professional Paper 1117, 49 p.

1979b, Hydraulic adjustment of the East Fork River to the supply of sediment, in Adjustments of the Fluvial System, Rhodes, D. D. and Williams, G. P. (eds.): Proceedings, Tenth Annual Geomorphology Symposium, Binghamton, N.Y., p. 69-94.

1979c, Effects of reduced streamflows on the hydraulic and geomorphic characteristics of channels in the Poplar River Basin, Montana, in Final Report of the Biological Resources Committee-Environmental Impact Assessment and Recommendations: International Poplar River Water-Quality Board, United States - Canada International Joint Commission, p. 93-110.

1980, Effective and bankfull discharges of streams in the Yampa River basin, Colorado and Wyoming: Journal of Hydrology, v. 46, p. 311-330.

Andrews, E. D., and Steele, T. D., 1980, A preliminary assessment of water-quality effects of emerging energy technologies on selected impact areas of the Upper Colorado River Basin: U.S. Water Resources Council, 116 p.

Andrews, Edmund D., 1981a, Measurement and computation of bed material discharge in a shallow sandbed stream, Muddy Creek, Wyoming: Water Resources Research, v. 17(1), p. 131-141.

1981b, Assessment of stream channel response to altered streamflow and sediment load, in Proceedings Workshop on Downstream river channel changes resulting from diversions or reservoir construction; Simons, D. B., Li, R. M., Lagasse, P., and Milhous, R. T. (eds.): U.S. Fish and Wildlife Service, Washington, D.C., p. 102-108.

1982a, Bank stability and channel width adjustment, East Fork River, Wyoming: Water Resources Research, v. 18(4), p. 1184-1192.

1982b, Adjustment of the East Fork River to bedload sediment contributed by Muddy Creek: Field Guide, First Annual Meeting, Pinedale, Wyoming, American Geomorphological Field Group, p. 57-68.

1983a, Entrainment of gravel from naturally sorted riverbed material: Bulletin, Geological Society of America, v. 94, p. 1225-1231.

1983b, Denudation of the Piceance Creek Basin, Colorado: Proceedings of the Hamburg Symposium, August 1983, on Dissolved Loads of Rivers and Surface Water Quantity/Quality Relationships, IAHS Publication no. 141, p. 205-215.

1984, Bed-material entrainment and hydraulic geometry of gravel-bed rivers in Colorado: Bulletin, Geological Society of America, v. 95, p. 371-378.

Parker, Gary, and Andrews, E. D., 1985, Sorting of bedload sediment by flow in meander bends: Water Resources Research, v. 21(9), p. 1361-1373.

Andrews, Edmund D., 1986, Downstream effects of Flaming Gorge Reservoir on the Green River, Colorado and Utah: Bulletin, Geological Society of America, v. 97, p. 1012-1023.

Andrews, E. D., and Erman, D. C., 1986, Persistence in the size distribution of surficial bed-material during an extreme snowmelt flood: Water Resources Research, v. 22(2), p. 191-197.

Parker, Gary, and Andrews, E. D., 1986, Time Development of Meander: Journal of Fluid Mechanics, v. 162, p. 139-156.

Andrews, E. D., and Parker, Gary, 1987, Formation of a coarse surface layer as the response to gravel mobility, in Gravel-Bed Rivers; Hey, R. D., Bathurst, J. C., and Thorne, C. R. (eds.), John Wiley and Sons, New York, p. 269-300.

Andrews, E. D., 1987, Longitudinal dispersion of trace metals in the Clark Fork River, Montana, in Chemical Quality of Water and the Hydrologic Cycle; Averett, R. C., and McKnight, D. M. (eds.), Lewis Publishers, Ann Arbor, Michigan, p. 179-191.

Andrews, E. D., and Webb, B. W., 1987, Emerging issues in surface water quality research, in Hydrology 2000; Kundzewicz, Z. W., Gottschalk, L., and Webb, B. (eds.): Wallingford, U.K., International Association of Hydrological Sciences, Publication no. 171, p. 27-33.

Erman, D. C., Andrews, E. D., and Yoder-Williams, M., 1988, Effects of winter floods on fish in the Sierra Nevada, California: Canadian Journal of Fisheries and Aquatic Sciences, v. 45(12), p. 2195-2200.

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Andrews, E. D., and Nelson, J. M., 1989, Topographic response of a bar in the Green River, Utah to variation in discharge, in Ikeda, Syunsuke and Parker, Gary (eds.): American Geophysical Union, Water Resources Monograph, v. 12, p. 463-485.

Andrews, E. D., 1990, Effects of streamflow and sediment on channel stability of the Colorado River--A perspective from Lees Ferry, Arizona, in The Geology of North America: v. 0-1; Surface Water Hydrology; Wolman, M. G. and Riggs, H. C. (eds.): Geological Society of America, p. 304-310.

Andrews, E. D., 1991, Sediment transport in the Colorado River basin, in Colorado River Ecology and Dam Management; Marzolf, G. R. (ed.): National Academy Press, Washington, D.C., p. 54-74.

Helsel, D. R., and Andrews, E. D., 1991, Discussion of "Trends in freshwater inflow to San Francisco Bay from the Sacramento--San Joaquin Delta" by Fox, J. P., Mongon, T. R. and Miller, W. J., 1990, Water Resources Bulletin, v. 27(2), p. 317-319.

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McKnight, D. M., Aiken, G. R., Andrews, E. D., Bowles, C. and Harnish, R. A., 1993, Dissolved organic material in Dry Valley lakes: A comparison of Lake Fryxell, Lake Hoare, and Lake Vanda, in Physical and Biogeochemical Processes in Antarctic Lakes; Green, William (ed.): American Geophysical Union, Monograph Series, Washington, D.C., v. 59, p. 119-133.

McKnight, D. M., and Andrews, E. D., 1993, Hydrologic and geochemical processes at the stream-lake interface in a permanently ice-covered lake in the McMurdo Dry Valleys, Antarctica: Verh. Internat. Verein. Limnol., v. 25, p. 957-959.

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Andrews, E. D., and Nankervis, J. M., 1995, Effective discharge and the design of channel maintenance flows for gravel-bed rivers, in Natural and Anthropogenic Influences in Fluvial Geomorphology; Costa, John (ed.): American Geophysical Union, Monograph 89, p. 151-164.

Von Guerard, P., McKnight, D.M., Harnish, R.A., Gartner, J.W., and Andrews, E.D., 1995, Streamflow, water-temperature, and specific-conductance data for selected streams draining into Lake Fryxell, Lower Taylor Valley, Victoria Land, Antarctica, 1990-92, Kidd, M., (ed.): U.S. Geological Survey Open-File Report 94-545, 65 p.

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Johnston, C.E., Andrews, E.D., and Pitlick, J., 1998, *In-situ* determination of particle friction angles of fluvial gravels, Water Resources Research, v. 34, p. 2017-2030.

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Schmidt, J.C., Andrews, E.D., Wegner, D.L., Patten, D.T., Marzolf, G.R., and Moody, T.O., 1999, Origins of the 1996 controlled flood in Grand Canyon, *in* Webb, R.H., Schmidt, J.C., Marzolf, G.R., and Valdez, R.A. eds., The Controlled Flood in Grand Canyon: American Geophysical Union, Monograph 110, p. 23-36.

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Webb, R.H., Wegner, D.L., Andrews, E.D., Valdez, R.A., and Patten, D.T., 1999, Downstream effects of Glen Canyon Dam on the Colorado River, *in* Webb, R.H., Schmidt, J.C., Marzolf, G.R., and Valdez, R.A. eds., The Controlled Flood in Grand Canyon: American Geophysical Union, Monograph, 110, p. 1-22.

Wiele, S.M., Andrews, E.D., and Griffin, E.R., 1999, The effect of sand concentration on depositional rate, magnitude, and location in the Colorado River below the Little Colorado River, *in* Webb, R.H., Schmidt, J.C., Marzolf, G.R., and Valdez, R.A. eds., The Controlled Flood in Grand Canyon: American Geophysical Union, Monograph, 110, p. 131-146.

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Andrews, E. D. and Vincent, K.R., 2007, Sand deposition in shoreline eddies along five Wild and Scenic Rivers, Idaho, River Research and Applications, V. 23, p. 7-20.

McKnight, D. M., Tate, C. M., Andrews, E. D., Niyogi, D. K., Cozzetto, K., Welch, K. Lyons, W. B. and Capone, D. G., 2007, Reactivation of a cryptobiotic stream ecosystem in the McMurdo Dry Valleys, Antarctica: a long-term geomorphologial experiment, Geomorphology, V. 89, p.186-204.

Vincent, K.R., and Andrews, E.D., 2007, Depositional settings of sand beaches along whitewater rivers, River Research and Applications, V. 24, p 771-788.

Gaeuman, D., Andrews, E.D., Krause, A. and Smith, W., 2009, Predicting fractional bed load transport rates: Application of the Wilcock-Crowe equations to a regulated gravel bed river. Water Resources Research, V. 45, W06409, doi:10.1029/2008WR007320.

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Andrews, E.D., 2013, Evaluation of alternative streamflows to improve aquatic and riparian habitat using an analysis of sediment transport in the Walker River Basin, NV. Draft report submitted to the US Fish and Wildlife Service, In Review, 125p.

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Employment

I have been a senior scientist with GeoEngineers since 2013. Current responsibilities focus on business development, project management, and technical product delivery. Prior to GeoEngineers, I was a senior research scientist at the Pacific Northwest National Laboratory for 19 years. In addition to my employment at GeoEngineers, I am an adjunct faculty member in the School of Earth and Environmental Sciences at Washington State University where I teach *Fundamentals of Environmental Hydrology* and advise undergraduate and graduate students.

Senior Fluvial Geomorphologist, GeoEngineers, Richland, WA, 2013 – present

Senior Research Scientist, Ecology Group, PNNL, Richland, WA, 1993 – 2013

Education

Ph.D., Environmental Science (fluvial hydraulics), Washington State University, Pullman, WA, 2006

Dissertation: Channel morphology, hyporheic exchange, and temperature gradients within Chinook salmon spawning habitat

Civil engineering coursework: Open Channel Hydraulics, Mechanics of Sediment Transport, Fluid Mechanics, Advanced Hydrology, Advanced Hydrogeology, Watershed Management, Advanced GIS Modeling

M.S., Natural Resource Sciences, Washington State University, Pullman, WA, 1993
B.S., General Sciences, University of Wisconsin, Madison, WI, 1989

Research Interests and Experience

My professional interests and projects focus on river processes and associated interactions with aquatic organisms and their habitats. Current and recent projects include fluvial geomorphic assessments of historic and contemporary gravel-bed river conditions, and evaluations of potential future channel adjustments. Many of these geomorphic assessments are applied to river restoration projects for the purposes of identifying the underlying processes that are responsible for the creation and maintenance of riverine and floodplain habitats. I incorporate this understanding of geomorphic processes into the analyses of restoration alternatives and the design of restoration actions. My areas of expertise include river hydraulics and sediment transport, quantitative fluvial geomorphology, assessment and modeling of aquatic habitats, and evaluation of groundwater – surface water interactions in rivers. Recent experience includes:

John Day Watershed Habitat Restoration Strategy, Confederated Tribes of the Warm Springs Reservation of Oregon, 2013 – present. Analysis of habitat limiting factors, development of basin-wide restoration strategies, and implementation of restoration actions for the John Day watershed.

Snake River Diversion Hydraulic and Sediment Transport Study, Idaho and New Sweden Irrigation Districts, 2013 – present. Analysis of hydraulics, sediment transport and channel morphology adjustments resulting from changes in river discharge.

Fort Hall Bottomlands Tributaries Assessment and Enhancement Strategy, Shoshone-Bannock Tribes, 2012 – present. Geomorphic and habitat assessment to identify strategies for habitat improvements and management solutions to protect, enhance, and restore native trout habitat.

Kentch Reach of the South Fork Walla Walla River Instream Design, Confederated Tribes of the Umatilla Indian Reservation, 2012 – present. Geomorphic assessment, hydraulic analysis, and design collaboration for channel realignment, side channel creation, and large wood habitat structures.

Cowiche Creek Restoration Design, Yakima County, 2012 – present. Geomorphic assessment, hydraulic analysis, and design collaboration for channel realignment, roughened riffle creation, and large wood habitat structures.

Big Wood River Geomorphic Assessment, City of Ketchum, ID, 2012. Analysis of hydraulics, sediment transport and channel morphology adjustments for the design of in-channel and floodplain modifications.

Walla Walla River Geomorphic Assessment: Bolen-Kelly Reach, Walla Walla Basin Watershed Council, 2012. Analysis of hydraulic characteristics, channel morphology, and development of multiple conceptual river and floodplain restoration designs.

Integrated science support to the Missouri River Recovery Program, U.S. Army Corps of Engineers, 2007 – 2013. Principal investigator and project manager supporting the Omaha District Corps Integrated Science Program, which is designed to avoid jeopardizing the survival and recovery of the least tern, piping plover, and pallid sturgeon.

Modeling environmental impacts of alternative hydropower operations, U.S. Department of Energy Waterpower Program, 2009 – 2013. Co-PI of a multi-laboratory interdisciplinary research team seeking to enhance environmental benefit and hydropower value through the development of integrated modeling tools.

Development of instream flow evaluation methods for hydropower operations, U.S. Department of Energy Waterpower Program, 2009 – 2013. Co-PI of a multi-laboratory interdisciplinary research team developing methods to predict, measure, and mitigate impacts from flow releases downstream of hydroelectric dams.

Basin Scale Opportunity Assessment in the Deschutes River Basin, U.S. Department of Energy Waterpower Program, 2009 – 2013. Co-PI of a multi-laboratory interdisciplinary research team. The goal of this initiative is to develop an approach to hydropower and environmental assessment that emphasizes sustainable energy systems within the context of basin-wide environmental protection/restoration, focusing on low impact or small hydropower and related renewable energy.

Grays River restoration of habitat-forming processes, Bonneville Power Administration, 2007 – 2011. Principal investigator and project manager of this collaborative effort with the Columbia River Estuary Study Taskforce (CREST) to restore habitat conditions and enhance salmon and steelhead populations in the Grays River.

Investigation of river channel modifications in the Wanapum Dam tailrace, Grant County PUD No. 2, 2010-2011. Co-PI of an interdisciplinary study to evaluate options for modifying riverbed characteristics in order to increase the quantity of fall Chinook salmon spawning habitat.

Predicting climate change impacts on hydropower and riverine ecosystems, U.S. Dept. of Energy, Laboratory Directed Research and Development Program, 2009 – 2011. Principal investigator and project manager of this interdisciplinary research project. The purpose of this project was to develop better scientific understanding and analytical tools to enhance the predictive capability of climate change effects on hydropower production and riverine ecosystems.

Effects of river discharge on hyporheic exchange and sediment transport in Snake River fall Chinook salmon spawning areas, Idaho Power Company, 2002 – 2007. Principal investigator and project manager of this research evaluating the habitat potential of historic Snake River fall Chinook salmon spawning areas by comparing the hyporheic exchange characteristics in those areas with those of contemporary Snake River fall Chinook salmon spawning areas.

Restoration potential of Snake River fall Chinook salmon spawning habitat, Bonneville Power Administration, 2003 – 2007. Principal investigator and project manager of research into hydroelectric dam management activities directed at enhancement of mainstem habitat and anadromous salmonid populations.

Publications

Peer-reviewed journals

Leek, R., J. Q. Wu, L. Wang, T. P. Hanrahan, M. E. Barber, and H. Qiu. 2009. Heterogeneous characteristics of streambed saturated hydraulic conductivity of the Touchet River, south eastern Washington, USA. Hydrological Processes DOI: 10.1002/hyp.7258.

Hanrahan, T. P. 2008. Effects of river discharge on hyporheic exchange flows in salmon spawning areas of a large gravel-bed river. Hydrological Processes 22(1): 127-141, DOI: 10.1002/hyp.6605.

Geist, D. R., C. J. Murray, T. P. Hanrahan, and Y. Xie. 2008. A model of the effects of flow fluctations on fall Chinook salmon spawning habitat availability in the Columbia River. North American Journal of Fisheries Management 28: 1911-1927, DOI: 10.1577/M07-074.1.

Geist, D. R., E. V. Arntzen, C. J. Murray, K. E. McGrath, Y. J. Bott, and T. P. Hanrahan. 2008. Influence of river level on temperature and hydraulic gradients in chum and fall Chinook salmon spawning areas downstream of Bonneville Dam, Columbia River. North American Journal of Fisheries Management 27: 30-41, DOI: 10.1577/M07-009.1.

Hanrahan, T. P. 2007. Large-scale spatial variability of riverbed temperature gradients in Snake River fall Chinook salmon spawning areas. River Research and Applications 23: 323-341, DOI: 10.1002/rra.982.

Hanrahan, T. P. 2007. Bedform morphology of salmon spawning areas in a large gravel-bed river. Geomorphology 86: 529–536, DOI: 10.1016/j.geomorph.2006.09.017.

Hanrahan, T. P., D. R. Geist, and E. V. Arntzen. 2005. Habitat quality of historic Snake River fall Chinook salmon spawning locations and implications for incubation survival. Part 1: Substrate quality. River Research and Applications 21 (5): 455-467.

Hanrahan, T. P., D. D. Dauble, and D. R. Geist. 2004. An estimate of chinook salmon spawning habitat and redd capacity upstream of a migration barrier in the upper Columbia River. Canadian Journal of Fisheries and Aquatic Sciences 61: 23-33.

Dauble, D. D., T. P. Hanrahan, D. R. Geist, and M. J. Parsley. 2003. Impacts of the Columbia River hydroelectric system on main-stem habitats of fall chinook salmon. North American Journal of Fisheries Management 23: 641-659.

Geist D. R., T. P. Hanrahan, E. V. Arntzen, G. A. McMichael, C. J. Murray, and Y. Chien. 2002. Physicochemical characteristics of the hyporheic zone affect redd sites of chum salmon and fall chinook salmon in the Columbia River. North American Journal of Fisheries Management 22(4):1077-1085.

Other

Hanrahan, TP, and KB Larson. 2012. Methods for quantifying shallow-water habitat availability in the Missouri River. PNNL-21193. Pacific Northwest National Laboratory, Richland, WA. Final report to U.S. Army Corps of Engineers, Omaha District, Missouri River Recovery Program.

Hanrahan, TP, TE Seiple, JW Lettrick. 2012. PNNL River Habitat Model Users Guide. PNNL-21048. Pacific Northwest National Laboratory, Richland, WA.

Bevelhimer M, TP Hanrahan, J Hayse, and B O'Connor. 2011. Tools and method development for environmental flows determination. Oak Ridge National Laboratory, Pacific Northwest National Laboratory, Argonne National Laboratory. Prepared for the Wind and Waterpower Program, Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, Washington, D. C.

Geist DR, TP Hanrahan, CR Vernon, and RP Mueller. 2011. Investigation of habitat modification in the Wanapum Dam tailrace to increase fall Chinook salmon spawning habitat. PNWD-4242. Battelle, Richland, WA.

Geerlofs S, N Voisin, K Ham, T Hanrahan, A Coleman, J Saulsbury, A Wolfe, B Hadjerioua, K Stewart. 2011. Integrated basin scale opportunity assessment initiative: Deschutes Basin preliminary hydropower and environmental opportunity assessment and fiscal year 2012 research plan. Prepared for the Wind and Waterpower Program, Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy, Washington, D. C. PNNL-20802. Pacific Northwest National Laboratory, Richland, WA.

Hanrahan, TP and CR Vernon. 2011. Monitoring and assessment of the Grays River Gorley Springs Restoration Project: 2010 final report. PNNL-21028. Pacific Northwest National Laboratory, Richland, WA.

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Oldenburg EW, BJ Goodman, JW Boyd, and TP Hanrahan. 2010. Summary of the 2007-2008 Annual synthesis report: Pallid sturgeon population assessment project and associated fish community monitoring for the Missouri River. PNNL-19501. Pacific Northwest National Laboratory, Richland, WA.

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Oldenburg EW, TP Hanrahan, RA Harnish, BJ Bellgraph, JP Duncan, and CH Allwardt. 2008. 2005 Annual Synthesis Report, Pallid Sturgeon Population Assessment Program and Associated Fish Community Monitoring for the Missouri River. PNNL-17539, Pacific Northwest National Laboratory, Richland, WA.

Oldenburg EW, TP Hanrahan, RA Harnish, BJ Bellgraph, JP Duncan, and CH Allwardt. 2008. 2006 Annual Synthesis Report, Pallid Sturgeon Population Assessment Program and Associated Fish Community Monitoring for the Missouri River. PNNL-17583, Pacific Northwest National Laboratory, Richland, WA.

Oldenburg EW, TP Hanrahan, RA Harnish, BJ Bellgraph, JP Duncan, and CH Allwardt. 2008. Summary of the 2006 Annual Synthesis Report, Pallid Sturgeon Population Assessment Program and Associated Fish Community Monitoring for the Missouri River. PNNL-17582, Pacific Northwest National Laboratory, Richland, WA.

Hanrahan, T.P., E.V. Arntzen, F. Khan, J.R. Stephenson, P.S. Titzler, C. Tunnicliffe. 2007. Hyporheic exchange characteristics in Snake River fall Chinook salmon spawning areas. Final report to Idaho Power Company. Battelle, Pacific Northwest Division, Richland, WA. PNWD-3847.

Hanrahan, TP, Richmond, MC, Arntzen, EV, Coleman, AM, Larson, KB, Perkins, WA, Tagestad, JD. 2007. Effects of hydroelectric dam operations on the restoration potential of Snake River fall Chinook salmon (Oncorhynchus tshawytscha) spawning habitat. Final Report for Project 200303800, Bonneville Power Administration, Portland, OR.

Geist, DR, Arntzen, EV, Chien, YJ, Hanrahan, TP, Murray, CJ, Perkins, WA, Richmond, MC, Xie, Y. 2006. Spawning habitat studies of Hanford Reach fall Chinook salmon (Oncorhynchus tshawytscha). Final report to U.S. Department of Energy Bonneville Power Administration, BPA Project 199406900. Pacific Northwest National Laboratory, Richland, WA.

Hanrahan, T. P., D. R. Geist, E. V. Arntzen, and C. S. Abernethy. 2004. Effects of hyporheic exchange flows on egg pocket water temperature in Snake River fall chinook salmon spawning areas. Final report to Bonneville Power Administration. PNNL-14850.

Hanrahan, T. P., D. D. Dauble, and D. R. Geist. 2001. An assessment of potential chinook salmon spawning habitat in the upper Columbia River: Chief Joseph Dam to Grand Coulee Dam. Final report to the Colville Confederated Tribes. PNWD-3119.

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Battelle and U. S. Geological Survey, 2000. Assessment of the impacts of development and operation of the Columbia River hydroelectric system on mainstem riverine processes and salmon habitats. Final report to the Bonneville Power Administration, Division of Fish and Wildlife, Portland, OR.

McMichael, G. A., R. L. Johnson, T. P. Hanrahan, E. V. Arntzen, J. A. Serkowski, and G. W. Patton. 2000. ADCP Velocity Profiling and Feasibility Hydroacoustics at Grand Coulee Dam in 2000. Final report to the Colville Confederated Tribes.

Hanrahan, T. P., D. A. Neitzel, D. R. Geist, and D. D. Dauble. 1999. Assessment of restoring predam channel morphology, salmonid habitats, and riverine processes through drawdown: Lower Snake River. Part 1, Appendix H, Lower Snake River Juvenile Migration Feasibility Study Draft EIS. U. S. Army Corps of Engineers, Walla Walla District.

Geist, D. R., T. P. Hanrahan, E. V. Arntzen, Z. K. Bevens. 1999. Assessment of hyporheic discharge within fall chinook salmon spawning habitat in the Hells Canyon Reach of the Snake River. Final report to the Idaho Power Co. 55 pp

Hanrahan, T. P., D. A. Neitzel, M. C. Richmond, and K. A. Hoover. 1998. Assessment of drawdown from a geomorphic perspective using geographic information systems: Lower Snake River, Washington. Final report submitted to U.S. Army Corps of Engineers, Walla Walla District.

Presentations and conference leadership

Hanrahan, TP, AP Levell, T Maguire, D Risso, and H Osborne. 2013. Geomorphic function and restoration potential of spring creeks in southeastern Idaho. To be presented at the American Water Resources Association Annual Conference, Portland, OR.

Hanrahan, TP. 2013. Implications of historic river channel modifications on contemporary restoration opportunities. To be presented at the American Geophysical Union Fall Meeting 2013, San Francisco, CA.

Hanrahan, TP, and CR Vernon. 2012. Evaluation of logjam scour in the context of reach-scale river channel adjustments. Presented at the American Geophysical Union Fall Meeting 2012, San Francisco, CA.

Hanrahan TP. 2012. Invited moderator for 2011 Flood Effects session at the Missouri River Natural Resources Committee Conference and BiOp Forum, 12-16 March 2012, Pierre, SD.

Hanrahan TP. 2011. Organizer and moderator of the Symposium on Environmental Flow Applications in the Management of Hydroelectric Dams: Science, Policy, and Management. American Fisheries Society Annual Meeting, 4-8 September 2011, Seattle, WA.

Hanrahan TP, and MC Richmond. 2011. Quantifying large river habitat restoration potential through hydrodynamic modeling and geomorphic analysis. Invited paper presented to the International Conference on the Status and Future of the World's Large Rivers, April 2011, Vienna, Austria. PNNL-SA-75432.

Hanrahan TP, and CR Vernon. 2010. Evaluating river restoration objectives as research hypotheses: a case study of engineered log jams. Presented at American Geophysical Union Fall Meeting 2010, San Francisco, CA. PNNL-SA-74841.

Vernon CR, and TP Hanrahan. 2010. Digital photograph analysis to quantify fine-grained sediment composition of riverbed surfaces." Presented at American Geophysical Union Fall Meeting 2010, San Francisco, CA. PNNL-SA-74821.

Hanrahan, TP, and AP Levell. 2010. An evaluation of large woody debris availability for river restoration with engineered logjams. Presented at Northwest Stream Restoration Design Symposium, Stevenson, WA. PNNL-SA-69067.

Levell AP, and TP Hanrahan. 2009. An evaluation of large woody debris availability for river restoration with engineered logjams. Presented at Pacific Salmonid Recovery Conference, Seattle, WA on 29 October 2009. PNNL-SA-68656.

Hanrahan TP. 2008. Fluvial geomorphology, hyporheic exchange, and fall Chinook salmon life history. Presented by Hanrahan, Timothy P. (Invited Speaker) at Groundwater-Columbia River Interactions Technical Workshop, Richland, WA on April 17, 2008. PNNL-SA-60189.

Xie YL, CJ Murray, TP Hanrahan, and DR Geist. 2008. Data Mining on Large Data Set for Predicting Salmon Spawning Habitat. Presented by YuLong Xie at Data Mining 2008 (WorldComp08), Las Vegas, NV on July 15, 2008. PNNL-SA-61340.

Hanrahan TP, and EV Arntzen. 2007. Effects of sediment accumulation on hyporheic exchange in Snake River fall Chinook salmon spawning areas. Paper presented to American Fisheries Society 2007 Annual Meeting, San Francisco, CA. PNWD-SA-7828.

Hanrahan TP, and MC Richmond. 2007. Effects of hydroelectric dam operations on the restoration potential of Snake River fall Chinook salmon spawning habitat. Poster presented to American Fisheries Society 2007 Annual Meeting, San Francisco, CA. PNNL-SA-55569.

Groves, P. A., and T. P. Hanrahan. 2006. Incubation survival of fall Chinook salmon within historic and contemporary spawning areas of the Snake River, Idaho, USA. Paper presented at The 10th International Symposium on Regulated Streams, Riverine Hydroecology: Advances in Research and Applications, August 2006, Stirling, Scotland, UK.

Hanrahan, T. P. and D. R. Geist. 2005. Bedform Morphology of Fall Chinook Salmon Spawning Areas. Paper presented at American Fisheries Society Annual Meeting, September 2005, Anchorage, Alaska.

Geist, D. R., E. V. Arntzen, and T. P. Hanrahan. 2005. Hyporheic zone characteristics within Chinook salmon spawning sites in the Hanford Reach of the Columbia River, Washington. Paper presented at American Fisheries Society Annual Meeting, September 2005, Anchorage, Alaska.

Hanrahan, T. P. 2004. Effects of river discharge on hyporheic exchange flows in large gravel-bed rivers: An empirical study. Fall Meeting, American Geophysical Union, December 2004, San Francisco, CA. EOS Trans. AGU 85(47), Fall Mtg. Suppl., Abstract H12B-08.

Hanrahan, T. P., D. R. Geist, and E. V. Arntzen. 2003. Effects of Hydrologic Exchange on Egg Pocket Water Temperature in Snake River Fall Chinook Salmon Spawning Areas. Paper presented at American Fisheries Society Annual Meeting, August 2003, Quebec, Canada.

Geist, D. R., T. P. Hanrahan, E. V. Arntzen, G. A. McMichael. 2003. Spawning Habitat Suitability in the Wanapum Dam Tailrace and Priest Rapids Pool, Columbia River, USA. Paper presented at American Fisheries Society Annual Meeting, August 2003, Quebec, Canada.

Hanrahan, T. P., D. D. Dauble, and D. R. Geist. 2002. An assessment of potential chinook salmon spawning habitat in the upper Columbia River: Chief Joseph Dam to Grand Coulee Dam. Western Division of the American Fisheries Society Annual Meeting, April 2002, Spokane, WA.

Dauble, D. D., T. P. Hanrahan, and D. R. Geist. 2002. Restoration strategies for fall chinook salmon in the mainstem Columbia and Snake rivers. Western Division of the American Fisheries Society Annual Meeting, April 2002, Spokane, WA.

Geist, D. R., E. V. Arntzen, and T. P. Hanrahan. 2002. Substrate quality of fall chinook salmon spawning habitat in the Snake and Columbia rivers. Western Division of the American Fisheries Society Annual Meeting, April 2002, Spokane, WA.

Hanrahan, T. P. and R. Jones. 2001. Assessment of restoring anadromous salmonid habitats and riverine processes in the lower Snake River, Washington. American Fisheries Society Annual Meeting, August 2001, Phoenix, AZ.

Dauble, D. D., T. P. Hanrahan, and D. R. Geist. 2001. Impacts of the Columbia River hydroelectric system on mainstem riverine processes and salmon habitats. American Fisheries Society Annual Meeting, August 2001, Phoenix, AZ.

McMichael, G. A., T. P. Hanrahan, and J. Lukas. 2001. Fall chinook salmon spawning habitat use versus availability in the Wanapum Dam tailrace, Columbia River, Washington. American Fisheries Society Annual Meeting, August 2001, Phoenix, AZ.

Hanrahan, Timothy P. 1999. Characterization of predam channel morphology and salmonid habitats in the Lower Snake River. 1999 Fall Meeting, American Geophysical Union, December 1999, San Francisco, CA.

Hanrahan, T. P., D. A. Neitzel, and M. C. Richmond .1998. A geomorphic assessment of Snake River drawdown and salmonid habitat using GIS. 1998 Annual General Meeting, North Pacific International Chapter of the American Fisheries Society, Union, WA.

Hanrahan, T. P., D. A. Neitzel, M. C. Richmond, and C. A. Pinney. 1998. Assessment of salmonid habitat from a geomorphic perspective using geographic information systems: Lower Snake River, Washington. 128th Annual Meeting of the American Fisheries Society, August 1998, Hartford, CT.

Professional Service

Advisor to graduate students at Washington State University and University of British Columbia

Reviewer for proposals submitted to the National Institutes for Water Resources 303(g) program administered for the U. S. Geological Survey

Reviewer for proposals submitted to the CALFED Bay-Delta Science Program administered by the State of California and the U.S. Department of Interior

Reviewer for manuscripts submitted to the journals *Advances in Water Research, Aquatic Sciences, Basic and Applied Ecology, Hydrogeology Journal, River Research and Applications, Canadian Journal*

of Fisheries and Aquatic Sciences, New Zealand Journal of Marine and Freshwater Research, Current Zoology, North American Journal of Fisheries Management

Judge for Outstanding Student Paper Awards, Hydrology Section of American Geophysical Union

Judge for the Mid-Columbia Science and Engineering Fair

Collaborator with faculty at Delta STEM High School, Richland, WA, to develop student projects integrated across the curriculum

Professional Affiliations

Member of the American Geophysical Union (Hydrology, Biogeosciences, and Education Sections)

Member of the American Water Resources Association

Member of the American Fisheries Society

Member of the Association of State Floodplain Managers (Natural and Beneficial Functions Subcommittee)

Curriculum Vitae

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Name **Robert B. Jacobson, Ph.D.**
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Education

Ph.D. – September 1986 **-- The Johns Hopkins University**, Whiting School of Engineering, Department of Geography and Environmental Engineering. Dr. M.G. Wolman, major advisor. Dissertation title: "*Spatial and temporal distributions of slope processes in the upper Buffalo Creek drainage basin, Marion County, West Virginia*".

B.A. – June 1979 **-- Carleton College**, Northfield, Minnesota. *Magna cum laude* with Department honors, in Geology.

Professional Experience

Current Position **Supervisory Research Hydrologist and Chief, River Studies Branch, Columbia Environmental Research Center,** U.S. Geological Survey, Biological Resources Discipline, Columbia, Missouri. I supervise a team of 30 aquatic ecologists and physical scientists engaged in interdisciplinary research on river ecosystem functions. The assignment includes developing collaborative studies with federal, state, and municipal agencies, and NGO's to improve the scientific understanding of river-corridor management and restoration

Professional Registration

- Missouri Registered Professional Geologist

Awards

- Department of Interior Superior Service Award, 2008

Professional Society Membership, Assignments

- Member Geological Society of America, American Geophysical Union, Ecological Society of America
- Member, AGU , Erosion and Sedimentation Committee, 1991 – 1996.

Other Professional Assignments, Contributions

- Member, Platte River Recovery Program, Independent Science Assessment Committee, 2009 – present.
- Associate Editor, *Water Resources Research, 2001 - 2005*
- Adjunct Associate Professor, Geography Department, University of Missouri
- Research associate, School of Natural Resources, University of Missouri
- Technical Consultant to Fish and Wildlife Service: Amended Biological Opinion (December 2003); Hydrology of New Madrid Floodway Project; Evaluation of Flow Alternatives on the Lower Missouri River Habitats and Endangered Species.
- Technical Consultant to U.S. Army Corps of Engineers: Expert panel for the "Restructured Navigation Study, Upper Mississippi and Illinois River"

Selected Peer-reviewed Publications:

Jacobson, R.B., Lindner, G., and Bitner, C.J., in press, The role of floodplain restoration in mitigating flood risk, Lower Missouri River, USA, in Hudson, P.F., and Middlekoop, H., eds., Geomorphology and

Management of Lowland Floodplains: North American and European Fluvial Systems in an Era of Global Environmental Change: New York, NY, Springer.

Williams, B.K., Wingard, G.L., Brewer, G., Cloern, J.E., Gelfenbaum, G., Jacobson, R.B., Kershner, J.L., McGuire, A.D., Nichols, J.D., Shapiro, C.D., van Riper, C., III, and White, R.P., 2013, U.S. Geological Survey Ecosystems science strategy--advancing discovery and application through collaboration, Circular: USGS Numbered Series: Reston, VA, U.S. Geological Survey, no. 1383-C, p. vii, 43 p.

Jacobson, R.B., 2013, Riverine habitat dynamics, in Shroder, J.F., ed., Treatise on Geomorphology, Volume 12: San Diego, Academic Press, p. 6-19.

Jacobson, R., and Faust, T.M., 2012, Hydrologic connectivity of floodplains, northern Missouri - Implications for management and restoration of floodplain forest communities in disturbed landscapes: River Research and Applications, p. 1-21.

Freeman, M.C., Buell, G.R., Hay, L.E., Hughes, W.B., Jacobson, R.B., Jones, J.W., Jones, S.A., Lafontaine, J.H., Odom, K.R., Peterson, J.T., Riley, J.W., Schindler, J.S., Shea, C., and Weaver, J.D., 2012, Linking river management to species conservation using dynamic landscape-scale models: River Research and Applications, p. n/a-n/a. 10.1002/rra.2575.

Tracy-Smith, E., Galat, D.L., and Jacobson, R.B., 2012, Effects of flow dynamics on the aquatic-terrestrial transition zone (ATTZ) of Lower Missouri River sandbars with implications for selected biota: River Research and Applications, v. 28, p. 793-813. 10.1002/rra.1492.

Fisher, W.L., Bozek, M.A., Vokoun, J.C., and Jacobson, R.B., 2012, Freshwater aquatic habitat measurements, in Zale, A.V., Parrish, D.L., and Sutton, T., eds., Fisheries Techniques, 3rd edition: Bethesda, Maryland, American Fisheries Society, p. 101-161.

Jacobson, R., Janke, T., and Skold, J., 2011, Hydrologic and geomorphic considerations in restoration of river-floodplain connectivity in a highly altered river system, Lower Missouri River, USA: Wetlands Ecology and Management, v. 19, no. 4, p. 295-316. http://dx.doi.org/10.1007/s11273-011-9217-3. 10.1007/s11273-011-9217-3

Jacobson, R.B., and Berkley, J., 2011, Conceptualizing and communicating ecological river restoration, in Simon, A., Bennet, S., and Castro, J., eds., Stream Restoration in Dynamic Fluvial Systems: Scientific Approaches, Analyses and Tools: AGU Geophysical Monograph 194, p. 9-28.

Jacobson, R.B., Elliott, C.M., and Huhmann, B.L., 2010, Development of a Channel Classification to Evaluate Potential for Cottonwood Restoration, Lower Segments of the Middle Missouri River, South Dakota and Nebraska U.S. Geological Survey Scientific Investigations Report 2010-5208, 38 p. http://pubs.usgs.gov/sir/2010/5208

Poff, N.L., Richter, B.D., Arthington, A.H., Bunn, S.E., Naiman, R.J., Kendy, E., Acreman, M., Apse, C., Bledsoe, B., Freeman, M.C., Henriksen, J.A., Jacobson, R.B., Kennen, J.G., Merritt, D.M., O'Keefe, J.H., Olden, J.D., Rogers, K., Tharme, R.E., and Warner, A., 2010, The ecological limits of hydrologic alteration (ELOHA): a new framework for developing regional environmental flow standards: Freshwater Biology, p. 1-24, DOI: 10.1111/j.1365-2427.2009.02204.x

Elliott, C.M., Huhmann, B.L., and Jacobson, R.B., 2009, Geomorphic classification of the Lower Platte River, Nebraska: U.S. Geological Survey Scientific Investigations Report 2009-5198, 29 p. http://pubs.usgs.gov/sir/2009/5198/

Reuter, J.M., Jacobson, R.B., Elliott, C.M., and DeLonay, A.J., 2009, Assessment of Lower Missouri River physical aquatic habitat and its use by adult sturgeon (genus Scaphirhynchus) 2005-07: U.S. Geological Survey Scientific Investigations Report 2009-5121, 81 p. http://pubs.er.usgs.gov/usgspubs/sir/sir20095121

Jacobson, R.B., Johnson, H.E., III, and Dietsch, B.J., 2009, Hydrodynamic simulations of physical aquatic habitat availability for pallid sturgeon in the Lower Missouri River, at Yankton, South Dakota, Kenslers Bend, Nebraska, Little Sioux, Iowa, and Miami, Missouri, 2006-07: U.S. Geological Survey Scientific Investigations Report 2009-5058, 67 p. http://pubs.usgs.gov/sir/2009/5058/

Elliott, C.M., Reuter, J.M., and Jacobson, R.B., 2009, Channel morphodynamics in four reaches of the Lower Missouri River, 2006-07: U.S. Geological Survey Scientific Investigations Report 2009-5074, 258 p. http://pubs.usgs.gov/sir/2009/5074/

Jacobson, R.B., Blevins, D.W., and Bitner, C.J., 2009, Sediment regime constraints on river restoration – An example from the Lower Missouri River, in James, L.A., Rathburn, S.L., and Whittecar, G.R., eds., Management and restoration of fluvial systems with broad historical changes and human impacts: Denver, Colo., Geological Society of America Special Paper 451 Special Paper 451, p. 1-22.

Jacobson, R.B., and Galat, D.L., 2008, Design of a naturalized hydrograph on the Lower Missouri River: Ecohydrology, v. 1, no. 2, p. 81-104.

Jacobson, R.B., Chojnacki, K.A., and Reuter, J.M., 2007, Land capability potential index (LCPI) for the Lower Missouri River valley: U.S. Geological Survey Scientific Investigations Report 2007-5256, 19 p. http://pubs.usgs.gov/sir/2007/5256/

Gaeuman, D., and Jacobson, R.B., 2007, Field assessment of alternative bedload transport estimators: Journal of Hydraulic Engineering, v. 133, no. 12, p. 1319-1328.

Gaeuman, D., and Jacobson, R.B., 2007, Quantifying fluid and bed dynamics for characterizing benthic physical habitat in large rivers: Journal of Applied Ichthyology, v. 27, p. 359-364.

Laustrup, M.S., Jacobson, R.B., and Simpkins, D.G., 2007, Distribution of potential spawning habitat for sturgeon in the Lower Missouri River: U.S. Geological Survey Open-File Report 2007-1192, 26 p. http://pubs.usgs.gov/of/2007/1192/

Elliott, C.M., and Jacobson, R.B., 2006, Geomorphic classification and assessment of channel dynamics in the Missouri National Recreational River, South Dakota and Nebraska: U.S. Geological Survey Scientific Investigations Report 2006-5313, 66 p. http://pubs.usgs.gov/sir/2006/5086/

Jacobson, R.B., editor, 2006, Science to support adaptive habitat management, Overton Bottoms North Unit, Big Muddy Fish and Wildlife Refuge, Missouri: U.S. Geological Survey Scientific Investigations Report 2006-5086, 116 p. http://pubs.usgs.gov/sir/2006/5086/

Jacobson, R.B., and Galat, D. L, 2006, Flow and form in rehabilitation of large-river ecosystems – an example from the Lower Missouri River: Geomorphology, doi:10.1016/j.geomorph.2006.01.014, 21 p.

PIERRE Y. JULIEN, Ph.D., P.Eng.

Long Resume

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EDUCATION

Degree	Field	Institution	Year
B.Sc.A.	Civil Engineering	Laval University	1977
M.Sc.	Civil Engineering (hydraulics)	Laval University	1980
Ph.D.	Civil Engineering (hydraulics)	Laval University	1983

PROFESSIONAL REGISTRATION

- Registered Professional Engineer since 1980, P.Eng. # 32325, Ordre des Ingénieurs, Québec, Canada.

PROFESSIONAL EXPERIENCE

- Tenured Full Professor, Dept. of Civil Engineering, CSU, 1995-present.
- Coordinator of the Hydraulics and Wind Engineering Division, 1997-00, and 2004-
- Leader of the Hydraulics Program, Dept. of Civil Engineering, CSU, 1996-00, and 2004-.
- Associate Dean for International Research and Development, CSU, 2006-07
- Tenured Associate Professor, Dept. of Civil Engineering, CSU, 1989-94.
- Assistant Professor, Department of Civil Engineering, CSU, 1985-89.
- Faculty Affiliate, Department of Civil Engineering, CSU, 1983-85.
- Professeur substitut, Département de Génie Civil, Université Laval, Québec, Canada, 1979-80.
- Graduate Research Assistant, Département de Génie Civil, Université Laval, Québec, Canada, 1974-79.
- Graduate Teaching Assistant, Département de Génie Civil, Université Laval, Québec, Canada, 1974-79.

AWARDS and HONORS

- Post-graduate scholarship from the National Research Council of Canada, CNRC-NSERC, 1977-79.
- NATO Post-doctoral fellowship, administered by Natural Sciences and Engineering Research Council of Canada, CNRC-NSERC, 1983-85.
- Best Paper Award, American Society of Agricultural Engineers, 1986.
- J.C. Stevens Award of the American Society of Civil Engineers, 1989.
- Halliburton New Faculty Research Award, College of Engineering, CSU, 1989.
- Faculty of the year at Allison Hall, Colorado State University, 1996.
- Abell Faculty Research and Graduate Program Support Award of Excellence for outstanding achievement and professionalism in education, research, and service to graduate students, College of Engineering, CSU, 1999.
- Faculty Research Award at the Civil Engineering Dept., CSU, 2002.
- Endowed Borland Professorship in Hydraulics at the Civil Engineering Department at CSU, since 2002.
- Hans Albert Einstein Award of the ASCE, 2004.
- Outstanding Faculty Performance Award, Civil Engineering Department, CSU, 2006.
- Faculty Award for Excellence in Service, Civil and Environmental Engineering Department, 2009.
- Best Reviewer of the ASCE Journal of Hydraulic Engineering, 2010.

TEACHING EXPERIENCE

- Erosion and Sedimentation, CSU.
- River Mechanics, CSU.
- Engineering Mechanics - Dynamics, CSU.

- Engineering Mechanics - Statics and Dynamics, CSU.
- Fluid Mechanics for Non-Engineers, CSU.
- Environmental River Mechanics, CSU.
- Hydrodynamics, Université Laval, Québec, Canada.
- Flow in Closed-Conduits, Université Laval, Québec, Canada.
- Experimental Fluid Mechanics and Hydraulics, Université Laval, Québec, Canada.

AWARDS and HONORS

- Post-graduate scholarship from the National Research Council of Canada, CNRC-NSERC, 1977-79.
- NATO Post-doctoral fellowship, administered by Natural Sciences and Engineering Research Council of Canada, CNRC-NSERC, 1983-85.
- Best Paper Award, American Society of Agricultural Engineers, 1986.
- J.C. Stevens Award of the American Society of Civil Engineers, 1989.
- Halliburton New Faculty Research Award, College of Engineering, CSU, 1989.
- Faculty of the year at Allison Hall, Colorado State University, 1996.
- Abell Faculty Research and Graduate Program Support Award of Excellence for outstanding achievement and professionalism in education, research, and service to graduate students, College of Engineering, CSU, 1999.
- Faculty Research Award at the Civil Engineering Dept., CSU, 2002.
- Endowed Borland Professorship in Hydraulics at the Civil Engineering Department at CSU, since 2002.
- Hans Albert Einstein Award of the ASCE, 2004.
- Outstanding Faculty Performance Award, Civil Engineering Department, CSU, 2006.
- Faculty Award for Excellence in Service, Civil and Environmental Engineering Department, 2009.
- Best Reviewer of the ASCE Journal of Hydraulic Engineering, 2010.

TEACHING EXPERIENCE

- Erosion and Sedimentation, CSU.
- River Mechanics, CSU.
- Engineering Mechanics - Dynamics, CSU.

- Engineering Mechanics - Statics and Dynamics, CSU.
- Fluid Mechanics for Non-Engineers, CSU.
- Environmental River Mechanics, CSU.
- Hydrodynamics, Université Laval, Québec, Canada.
- Flow in Closed-Conduits, Université Laval, Québec, Canada.
- Experimental Fluid Mechanics and Hydraulics, Université Laval, Québec, Canada.

WORKSHOPS AND SHORT COURSES

- Five Day Short Course on Principles of Applied Hydrology: Catchment Hydrology and Sediment Transport. Renewable Energy School (RES), University of Akureyri, June 21-25, 2010, Akureyri, Iceland.
- Two Day Short Course on Sediment Transport, Faculty of Civil Engineering,Universiti Teknologi MARA, April 6-7, 2010, Shah Alam, Selangor, Malaysia.
- Four Day Short Course: "TREX Training Seminar" Primary Instructors M. Velleux and S.C. Shah-Fairbank in collaboration with P.Y. Julien, J. Halgren and J. England. Engineering Research Center, Colorado State University, Fort Collins, CO 80523, June 2-5, 2009.
- Two-day Short Course on "Erosion and Sedimentation", at the University Gadjah Mahda, Yogjakarta, Indonesia, July 22-23, 2009.
- One-day Short Course on "Sedimentation in Dams and Reservoirs: Problems and Solutions, "Part of the International Conference on Construction and Building Technology, Kuala Lumpur, June 16, 2008.
- Half-Day Technical Talk on "Sedimentation and River Engineering," Sponsored by the Ministry of Natural Resources and Environment (NRE) and the Department of Irrigation and Drainage (DID) Malaysia, at the River and Coastal Division of DID, Kuala Lumpur, Malaysia, March 12, 2008.
- One-week Short Course on Erosion and Sedimentation, Universiti Teknologi MARA, Shah Alam, Selangor, Malaysia, January 7-12, 2008.
- One and one-half Day Short Course on Sedimentation in Dam and Reservoir: Problems and Solutions, Department of Civil Engineering,Universiti Tenaga Nasional, UNITEN, July 20-21, 2006, Selangor Darul Ehsan, Malaysia.
- One and one-half Day Short Course on River Protection and Watershed Modeling, Faculty of Civil Engineering,Universiti Teknologi MARA, May 26-27, 2006, Shah Alam, Selangor, Malaysia.
- Three-day Short Course on River Engineering and Stream Rehabilitation, organized by the Key State Laboratory, College of Water Resources and Hydropower, Wuhan University, Sept. 19-21, 2005, Wuhan, China.
- Invited Speaker at the three-day "River Rehabilitation Seminar - River M-1", organized by REDAC, Universiti Sains Malaysia, in collaboration with DID and Wira Kerjaya Sdn.Bhd., Penang, Malaysia, May 2005.
- Three-day Short course entitled: "River Engineering and Stream Restoration" by P.Y. Julien and S. Ikeda at the 4th International Symposium on Environmental Hydraulics, Hong Kong, Dec. 2004.
- Half-day Seminar entitled "Stream Restoration and River Mechanics", part of the First International Conference on Managing Rivers in the 21st Century, Universiti Sains Malaysia, Penang, Malaysia, September 20, 2004.
- Short Course: Special Topics in Hydraulics - Keynote Lectures in

Saskatoon, Canada, 1985.

MANUSCRIPT AND PROPOSAL REVIEWS

- Editor of the ASCE Journal of Hydraulic Engineering - handled the review of about 1250 refereed journal articles from 2002-05.
- Reviewed about five hundred additional papers for ASCE, AGU, IAHR, JGR, JASC, Catena, Sed. Geol., J. Hydrol., IASTED, IJSR, and numerous conferences articles.
- Reviewed more than 160 refereed journal papers from 2006-11.
- Reviewer of about 60 proposals for NSF, ARO, USBR, SERDP, etc.
- Reviewer of more than 50 books, book proposals and technical reports since 2006.

PROFESSIONAL STUDIES

- Analysis of the morphological changes of the Rio Grande River since the construction of Cochiti Dam, for the U.S. Bureau of Reclamation, Albuquerque, since 1997.
- Development of models for surface runoff, upland erosion, fate and transport of metals with applications at the EPA Superfund site at California Gulch, Colorado, for the ARO-ARL CG/AR Center for Geosciences since 1986.

- Benchmarking Review of CWPRS for the World Bank, 2012.
- Stream Restoration Analysis of the Mangyeong River and Cheongmi Stream, in collaboration with Myongji University and KICT, South Korea, 2009-10.
- Analysis of the sedimentation of the Lower Nakdong River near the Nakdong River Estuary Barrage, in collaboration with PNU and KOWACO/K-Water, 2002-10.
- Sedimentation Analysis of Chicha and Sumbay Dams, Peru for MWH, 2010.
- Expertise on riprap design at the bridgewater powerhouse for the Shaw Group, 2010.
- River Management Manual, in collaboration with DNA for the Department of Irrigation and Drainage (JPS), Kuala Lumpur, Malaysia, 2008-09 - 612 p.
- Hydraulic Analysis for the Restoration of Cheongmi Stream, in collaboration with Myongji University and KICT, South Korea, 2008-09.
- Analysis of the Particle Size Distribution of the Gila River for Stantec, Phoenix, Arizona, 2009.

- Review of the Raritan Dam Removal Project for MWH, Denver, 2009.
- Review of the Marlin Dam Break Modeling of Liquefied Mine Tailings, for MWH, Denver, 2008-09.
- Sediment Analysis Report - Four Mile Canyon Creek Downstream of 30th Street, analysis with Moser and Associates for the UDFCD and the City of Boulder, CO, 2008-09.
- Analysis of the Design Options of the Flood Mitigation Plan for Muda River, Malaysia, for DID and USM-REDAC, 2006.
- Analysis of the sedimentation and watershed modeling of the Imha Reservoir, for KOWACO, 2005-06.
- Analysis of the retrofitting of bridge piers against scour for the Gupo and subway bridges on the Lower Nakdong River, South Korea, with Pusan National University, 2006.
- Analysis of Bendway Weirs for the Engineering Research and Development Center, Vicksburg, Mississippi, 2001-04.
- Analysis of sediment transport at the Arroyo Pasajero for the California Department of Water Resources, Sacramento, 2001-03.
- Analysis of the San Acacia Diversion Dam as related to the passage of the Silvery Minnow, for the U.S. Bureau of Reclamation, Albuquerque, 2001-03.
- Analysis of metal transport in streams from mining wastes for the EPA Hazardous Substance Research Center, 2001-03.
- Analysis of the changes in resistance to flow of the Rhine River during floods, for Delft Hydraulics and the Rijkswaterstaat, The Netherlands, 1999-00.
- Analysis of actinide migration at Rocky Flats, for Kaiser-Hill, 1998-99.
- Member of the Academic Review Team for the Analysis of sediment transport near Old Mississippi River Control, Lower Mississippi River, for Louisiana Hydroelectric and the U.S. Army Corps of Engineers, 1997-99.
- Review of Uranium Mill Tailings at L-Bar, New Mexico, for the U.S. Nuclear Regulatory Commission, 1997-99.
- Analysis of contaminated sediment transport at an EPA superfund site on Whitewood Creek, South Dakota, for ISSI, 1998.
- Expert witness on the Jacinto River Flood in Texas, for the U.S. Department of Justice, 1998.
- Analysis and review of the canal intake and desilting works at the Aligidir Irrigation Project in Eritrea, for NRCE, 1997.
- Report review "Trinity River - Maintenance Flow Study" for the U.S. Fish and Wildlife Service, 1997-1998.
- Analysis of the changes in dune geometry of the Rhine River during floods, for Delft Hydraulics and the Rijkswaterstaat, The Netherlands, 1991-93.
- Pipeline sedimentation study, for Tubecon, Québec, Canada, 1988.
- Sedimentation Analysis of the Rivière-à-Mars, for Université Laval, Canada, 1985.

113-128.
74. Park, S.K., P. Y. Julien, U. Ji and J.F. Ruff, "*Case-study: Pier Scour Protection for the Gupo and Subway Bridges on the Lower Nakdong River, South Korea*" , Journal of Hydraulic Engineering, ASCE, Vol.134, No. 11, 2008, pp.1639-1650.
75. Leon, C., P.Y. Julien and D.C. Baird, "*Case Study: Equivalent Widths of the Middle Rio Grande, New Mexico*" ,Journal of Hydraulic Engineering, ASCE, Vol.135, No. 4, 2009, pp. 306-315.
76. Julien, P.Y., A. Ab. Ghani, N.A. Zakaria, R. Abdullah and C.K. Chang, "*Case-Study: Flood Mitigation of the Muda River, Malaysia,*" Journal of Hydraulic Engineering, ASCE, Vol. 136, No. 4, 2010 , pp. 251-261.
77. Shin, Y.H. and P.Y. Julien, "*Changes in Hydraulic Geometry of the Hwang River below the Hapcheon Re-regulation Dam, South Korea*", International Journal of River Basin Management, IAHR, Vol.8, No.2, 2010, pp. 139-150.
78. Duan, J.G. and P.Y. Julien, "*Numerical Simulation of Meandering Evolution*", Journal of Hydrology, Vol. 391, 2010, pp. 34-46.
79. England Jr., J.F., J.E. Godaire, R.E. Klinger, T. R. Bauer and P.Y. Julien, "*Paleohydrologic Bounds and Extreme Flood Frequency of the Upper Arkansas River, Colorado, USA*", Journal of Geomorphology, Vol.124, 2010, pp. 1-16.
80. Shin, Y.H. and P.Y. Julien, "*Case-Study: Effect of Flow Pulses on Degradation Downstream of Hapcheon Dam, South Korea*", Journal of Hydraulic Engineering, ASCE, Vol. 137, No. 1, 2011, pp. 100-111.
81. Kim, J., P.Y. Julien, U. Ji, and J. Kang, "*Restoration Modeling Analysis for Abandoned Channels of the Mangyeong River*", Journal of the Environmental Sciences, 2011, pp. 555-564.
DOI: 10.5322/JES.2011.20.5.555
82. Johnson, B., Zhang, Z., Velleux, M. and P.Y. Julien, "*Development of a Distributed Watershed Contaminant Transport, Transformation, and Fate (CTT&F) Sub-model*", Soil and Sediment Contamination: An International Journal, Vol.20, No.6, 2011, pp. 702-721.
DOI: 10.1080/15320383.2011.594111
83. Ji, U., P.Y. Julien and S.K. Park, "*Case-Study: Sediment Flushing and Dredging near the Nakdong River Estuary Barrage*", Journal of Hydraulic Engineering, ASCE, Vol.137, No.11, 2011, pp. 1522-1535.
84. Shah-Fairbank, S., P.Y. Julien and D.C. Baird, "*Total Sediment Load from SEMEP using Depth-Integrated Concentration Measurements*", Journal of Hydraulic Engineering, ASCE, Vol. 137, No. 12, 2011, pp. 1606-1614.
85. Lee, J.S., P.Y. Julien, J. Kim and T.W. Lee, "*Derivation of Roughness Coefficient Relationships using Field Data in Vegetated Rivers*", J. Korean Water Resources Association, Vol. 45, No. 2, 2012, pp.137-149.

http://dx.doi.org/10.3741/JKWRA.2012.45.2.137
86. Velleux, M., A. Redman, P. Paquin, R. Santore, J.F. England Jr., and P.Y. Julien, "*Exposure Assessment for Potential Risks from Antimicrobial Copper in Urbanized Areas*", Environmental Science and Technology, Vol. 46, 2012 , pp. 6723-6732. http://dx.doi.org/10.1021/es204452w
87. Lee, J.S., and P.Y. Julien, "*Resistance Factors and Relationships for Measurements in Fluvial Rivers*", The Journal of Korea Contents Association, JKCA, Vol. 12, No. 7, pp. 445-452. http://dx.doi.org/10.5392/JKCA.2012.12.07.445
88. An, S.D., P.Y. Julien and S.K. Venayagamoorthy. "*Numerical Simulation of Particle Driven Gravity Currents*", Environmental Fluid Mechanics, 13 September 2012, DOI 10.1007/s10652-012-9251-6.
89. Lee, J.S. and P.Y. Julien, "*Utilizing the Concept of Vegetation Freeboard Equivalence in River Restoration*", International Journal of Contents, The Korea Contents Association, Vol.8, No.3, pp. 34-41. http://dx.doi.org/10.5392/IJoC.2012.8.3.034

Julien, P.Y., and B. Bounvilay, "Velocity of Rolling Bedload Particles", Journal of Hydraulic Engineering, Vol., No., pp. (In press, Feb 2013).

Kositgittiwong, D., C. Chinnarasri and P.Y. Julien, "Numerical Simulation of Flow Velocity Profiles along a Stepped Spillway", International Journal of Physical Sciences, Vol., No., pp. (#1 submitted June 2012).

Chinnarasri, C., D. Kositgittiwong and P.Y. Julien, "Modelling of Flow Behaviour through Spillways using CFD", ICE Water Management, Vol., No., pp. (#3 submitted June 2012).

England, J.F., P.Y. Julien and M.L. Velleux, "Physically-Based Extreme Flood Frequency Analysis Using Stochastic Storm Transposition and Paleoflood Data", Water Resources Research, Vol. No., 201, pp. (resubmitted Oct. 2012).

Halgren, J. and P.Y. Julien, "Multi-Event Hybrid Hydrologic Modeling at California Gulch, Colorado", J. Hydrology, Vol., No., pp. (submitted July 2012).

Bussi, G., F. Frances, J.J. Montoya and P.Y. Julien. "Implementation of a distributed erosion and sediment yield model in the Goodwin Creek experimental basin (USA): implications of initial sediment deposits on model calibrations," Journal of Environmental Modelling and Software, Vol. No., 201, pp. (Submitted Nov. 2012).

Curriculum Vitae *CV2013-6pp.doc*

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EDUCATION

The Johns Hopkins University. PhD, Geography and Environmental Engineering 1988. Dissertation: *Salmonid spawning gravels: A geomorphic perspective on their distribution, size modification by spawning fish, and application of criteria for gravel quality.*
University of California at Santa Cruz. MS, Earth Sciences 1982. Thesis: *Recent channel instability and historic channel changes of the Carmel River, Monterey County, California.*
Princeton University. AB cum laude, Geology 1978. Thesis: *Genesis & development of Sandy Hook NJ*

PROFESSIONAL EXPERIENCE

University of California at Berkeley
Chair, Department of Landscape Architecture and Environmental Planning: 2011-present
Professor of Environmental Planning and Geography: 2007 to present (appointed Asst Prof 1988)
Chair, Portuguese Studies Program: 2001-present
Regular university courses:
Mediterranean-Climate Landscapes, Environmental Sciences for Sustainable Development, River Restoration, Hydrology for Planners.
Professional shortcourses:
Week-long shortcourse *Geomorphic and ecological fundamentals for river and stream restoration* offered annually since 1995 at Sagehen Creek Field Station, Truckee, California, and components taught also at Beaumont du Ventoux & Lyon, France; Univ of Lisbon; & National Cheng Kung Univ, Taiwan.

SERVICE ON EDITORIAL BOARDS

Associate Editor, Water Resources Research (2011 to present)
Associate Editor, Environmental Management (1999 to present)

SERVICE ON GOVERNMENT ADVISORY BOARDS

Technical Review Committee for the Greater Mississippi Basin Post-Flood Assessment, US Army Corps of Engineers: 2012-2013
National Research Council Committee on Hydrology, Ecology, Fishes of the Klamath River Basin
Member: 2006-2007
Federal Interagency Flood Risk Management Committee Member: 2005-2007
Environmental Advisory Board to the Chief of the US Army Corps of Engineers: Member: 2002-2007
CALFED Bay-Delta Program Ecosystem Restoration Program Science Board: Member: 1999-2005

RECENT PEER-REVIEWED PUBLICATIONS

Kondolf, G.M., L.A. Mozingo, J.R. McBride, K. Kullman, and S. Anderson. 2013. Teaching river restoration: experiences from interdisciplinary studio instruction. *Landscape Journal* 32:98-114.

Kondolf, G.M., K. Podolak, and T.E. Grantham. 2012. Restoring Mediterranean-climate rivers. *Hydrobiologia*. DOI 10.1007/s10750-012-1363-y

Deitch, M.J., and G. M. Kondolf. 2012. Consequences of variations in magnitude and duration of an instream environmental flow threshold across a longitudinal gradient. *Journal of Hydrology* 420–421: 17–24. DOI:10.1016/j.jhydrol.2011.11.003

Ludy, J. and G.M. Kondolf. 2012. Flood risk perception in lands 'protected' by 100-year levees. *Natural Hazards* 61(2):829-842. DOI: 10.1007/s11069-011-0072-6

Kondolf, G.M. 2011. Setting Goals in River Restoration: When and Where Can the River 'Heal Itself'? in Simon, A. et al (eds) *Stream Restoration in Dynamic Fluvial Systems: Scientific Approaches, Analyses, and Tools*. Geophyical Monograph Series Vol.194 pp.29-43. American Geophysical Union, Washington DC. DOI: 10.1029/2010GM001020.

Kondolf, G.M., S. Anderson, R. Storesund, M. Tompkins, and P. Atwood. 2011. Post-project appraisals of river restoration in advanced university instruction. *Restoration Ecology* doi: 10.1111/j.1526-100X.2011.00803.x

Michalková, M., H. Piégay, G.M. Kondolf, and S.E. Greco. 2011. Longitudinal and temporal evolution of the Sacramento River between Red Bluff and Colusa, California, USA (1942-1999). *Earth Surface Processes and Landforms* 36:257-272. DOI:10.1002/esp.2106.

Lassettre, N.S. and G.M. Kondolf. 2011. Large wood in urban stream channels: re-defining the problem. *River Research and Applications*. DOI: 10.1002/rra.1538

Kilber, K. D. Tullos, and G.M. Kondolf. 2011. Learning from dam removal monitoring: challenges to selecting experimental design and establishing significance of outcomes. *River Research and Applications* 27:967-975. DOI: 10.1002/rra.1415

MacWilliams, M.L., M.R. Tompkins, R.L. Street, G.M. Kondolf, and P.K. Kitanidis. 2010. An assessment of the effectiveness of a constructed compound channel river restoration project on an incised stream. *Journal of Hydraulic Engineering* 136(12): 1042-1052. DOI: 10.1061/(ASCE)HY.1943-7900.0000196

Minear, T. and G.M. Kondolf. 2009. Estimating reservoir sedimentation rates at large spatial- and temporal-scales: a case study of California. *Water Resources Research* 45. W12502 doi:10.1029/2007WR006703

Bosselmann, P.C., G.M. Kondolf, J. Feng, G. Bao, Z. Zhang, and M. Liu. 2009. The future of a Chinese water village: alternative design practices aimed to provide new life for traditional water villages in the Pearl River Delta. *Journal of Urban Design* 15(2):243-267.

Constantine, J.A., T. Dunne, H. Piégay, and G.M. Kondolf. 2010. Controls on the alluviation of oxbow lakes by bed-material load as observed along the Sacramento River of California. *Sedimentology* 57:389-407.

Chin, A., S. Anderson, A. Collison, B. Ellis-Sugai, J.P. Haltiner, J. Hogervorst, G.M. Kondolf, L.S. O'Hirok, A.H. Purcell, and E. Wohl. 2009 Linking theory and practice for restoration of step-pool streams. *Environmental Management* 43:645-661.

Deitch, M.,J., G.M. Kondolf, and A.M. Merenlender. 2009. Hydrologic impacts of small-scale instream diversions for frost and heat protection in the California wine country. *River Research & Applications* 25:118-134.

Deitch, M.J., G.M. Kondolf, and A.M. Merenlender. 2009**.** Surface water balance to evaluate the hydrological impacts of small instream diversions and application to the Russian River basin, California, USA. *Aquatic Sciences: Marine and Freshwater Ecosystems* 19: 274-284.

Kondolf, G.M., P. Angermeier, K. Cummins, T. Dunne, M. Healey, W. Kimmerer, P.B. Moyle, D. Murphy, D. Patten, S. Railsback, D. Reed, R. Spies, and R. Twiss. 2008. Prioritizing river restoration: Projecting cumulative benefits of multiple projects: an example from the Sacramento-San Joaquin River system in California. *Environmental Management* 42:933-945 (DOI: 10.1007/s00267-008-9162-y)

Rovira, A., and G.M. Kondolf. 2008. Bed mobility on the Deschutes River, Oregon: tracer gravel results. *Geodinamica Acta* 21:11-22.

Tompkins, M.R., and G.M. Kondolf. 2007. Systematic post-project appraisals to maximize lessons learned from river restoration projects: Case study of compound channel construction projects in Northern California. *Restoration Ecology* 15(3):524-537.

Kondolf, G.M., S. Anderson, R. Lave, L. Pagano, A. Merelender, and E. Bernhardt. 2007. Two decades of river restoration in California: What can we learn? *Restoration Ecology* 15(3):516-523.

Kondolf, G.M., H. Piégay, and N. Landon. 2007. Changes since 1830 in the riparian zone of the lower Eygues River, France. *Landscape Ecology* 22:367-384.

Simon, A., M. Doyle, G.M. Kondolf, F.D. Shields, Jr., B. Rhoads, and M. McPhillips. 2007. Critical evaluation of how the Rosgen classification and associated "natural channel design" methods fail to integrate and quantify fluvial processes and channel response. *Journal of the American Water Resources Association* 43(5):1117-1131.

Kondolf, G.M. River restoration and meanders. 2006. *Ecology and Society.* [online] URL: *http://www.ecologyandsociety.org/vol11/iss2/art42/*

Kondolf, G.M., A. Boulton, S. O'Daniel, G. Poole, F. Rahel, E. Stanley, E. Wohl, A. Bang, J. Carlstrom, C. Cristoni, H. Huber, S. Koljonen, P. Louhi, and K. Nakamura. 2006. Process-based ecological river restoration: Visualising three-dimensional connectivity and dynamic vectors to recover lost linkages. *Ecology and Society* 11 (2): 5. [online] URL: *http://www.ecologyandsociety.org/vol11/iss2/art5/*

Kondolf, G.M., and R.J. Batalla. 2005. Hydrological effects of dams and water diversions on rivers of Mediterranean-climate regions: Examples from California. In C. Garcia and R.J. Batalla (eds.) *Catchment dynamics and river processes: Mediterranean and other climate regions*. Elsevier, London. pp.197-211.

BOOKS

Kondolf, G.M., & H. Piégay, eds. 2003. *Tools in fluvial geomorphology*. John Wiley & Sons, Chichester, 696 pp.

RECENT PAPERS PUBLISHED IN SYMPOSIA PROCEEDINGS AND BOOK CHAPTERS

Kondolf, G.M., Z.K. Rubin, J.T. Minear, and C. Alford. Cumulative sediment reduction to the lower Mekong River from planned dams. In *Proceedings 12th International Symposium on River Sedimentation, Kyoto, Japan.*

Kondolf, G.M. The espace de liberté and restoration of fluvial process: When can the river restore itself and when must we intervene? *River Conservation and Restoration*, P. Boon & Paul Raven, editors. John Wiley & Sons, Chichester. pp.225-242.

Bouleau, G. and G.M. Kondolf. 2011. Rivers of diversity: evolving water regulation in California and the European Union. in *Transatlantic Regulatory Cooperation: The Shifting Roles of the EU, the US and California.* D. Vogel and J. Swinnen, eds. Edward Elgar, Cheltenham, UK. pp. 83-101.

Kondolf, G.M. and Piégay, H. 2010. Geomorphology and society. Chapter 6 in *Handbook of Geomorphology*, K. Gregory, ed., SAGE Publications, London, pp.105-117.

Wohl, E., A. Chin, J. Haltiner, and G.M. Kondolf. 2010. Managing stream morphology with check dams. In C.C. Garcia and M.A. Lenzi (eds), *Check Dams, Morphological Adjustments*. Nova Science Publishers, Inc. p135-149.

Kondolf, G.M. 2009. An environmental perspective in city-river relationships. *in Cities and rivers, perspectives towards a sustainable partnership*, Livro nº 8 da Colecção Expoentes, edições da PARQUE EXPO, através do Núcleo de Comunicação da Parque EXPO, Lisbon.

Kondolf, M. 2009. Rivers, meanders, and memory. pp. 106-119 in M. Treib, ed., *Spatial Recall*, Taylor & Francis

Church, M., T.P. Burt, V.J. Galay, and G.M. Kondolf. 2009. Rivers. Chapter 4 in O. Slaymaker T. Spencer, and C. Embleton-Hamann, editors, *Landscape change in the 21st century*, Cambridge University Press.

Kondolf, G.M., L. A. Mozingo, S. Anderson, and J.R. McBride. 2009. Teaching ecological restoration of rivers and streams. *The Berkeley Chronicle* Spring 2009: 171-188.

Kondolf, G.M., and G. Zolezzi. 2008. Reference river ecosystems: historical states, best ecological potential, and management challenges. pp.1047-1050 in *River Restoration 2008*, Proceedings of the IVth European Center for River Restoration Conference, Venice, June 2008. B. Guimiero, M. Rinadi, and B. Fokkens, eds.

Eisenstein, W., and G.M. Kondolf. 2008. Planning water use in California. *Access* 33 (Fall 2008):8-17. Available online: http://www.uctc.net/access/33/Access%2033%20-%2003%20-%20Water%20Use%20in%20California.pdf

Kondolf, G.M., J.G. Williams, T. Horner, and D. Milan. 2008. Assessing physical quality of spawning habitat. pp.249-274 in D. Sear, P. DeVries, and S. Greig (eds.) *Salmon spawning habitat in rivers:*

Physical controls, biological responses, and approaches to remediation. American Fisheries Society Symposium 65. American Fisheries Society, Bethesda, MD.
Wohl, E., M. Palmer, and G.M. Kondolf. 2008. River management in the United States. pp. 174-200 in G.J. Brierly & K.A. Fryirs, eds. *River Futures: An integrative scientific approach to river repair.* Island Press, Washington.

Kondolf, G.M., and C-N. Yang. 2008. Planning river restoration projects: Social and cultural dimensions. pp.43-60 in D. Sear and S. Darby (eds.) *River Restoration: Managing the Uncertainty in Restoring Physical Habitat*. Wiley, Chichester.

Kondolf, G.M. 2006. When dams get old: Dam removal in western North America pp. 373-376 in Lanz, K., Mueller, L., Rentsch, C., and Schwarzenbach, R. P. eds.: *Who owns the water*? (*Wem gehoert das Wasser*?), Baden, Switzerland, Lars Müller Publishers. 536 pages.

Kondolf, G.M. 2006. River and stream restoration. In American Planning Association *Planning and urban design standards* (pp. 122-124). John Wiley & Sons, Hoboken, N.J.

Kondolf, G.M. 2006. Floodplains and riparian corridors. In American Planning Association *Planning and urban design standards* (pp. 118-121). John Wiley & Sons, Hoboken, N.J.

Kondolf, G.M. 2006. Rivers and streams. In American Planning Association *Planning and urban design standards* (pp. 115-117). John Wiley & Sons, Hoboken, N.J.

RECENT TECHNICAL REPORTS

Serra-Llobet, A., G.M. Kondolf, and S. Nicholson. 2012. *Wise Use of Floodplains: Adaptation in America and Europe*. Proceedings from March 2012 workshop (in press)

Simons, C.W., and G.M. Kondolf, editors. 2012. Crossings: Natural and Cultural Values for Sustainable Development of the Naturtejo Geopark. *Institute of Urban and Regional Development Working Paper* No. 2012-01. University of California, Berkeley. Available online at: http://www.iurd.berkeley.edu/publications/wp/wp-2012-01.pdf

Kondolf GM, et al. 2011. Connecting Cairo to the Nile: Renewing life and heritage on the river. *Institute of Urban and Regional Development Working Paper* No. 2011-007. University of California, Berkeley. Available online: *http://laep.ced.berkeley.edu/research/cairo/publication/*

Stein, ED, K Vyverberg, G M Kondolf, and K Janes. 2011. Episodic stream channels: imperatives for assessment and environmental planning in California. Proceedings of a special technical workshop, November 2010, Costa Mesa, California. *Southern California Coastal Water Research Project Report* No. 0645.

Kondolf, G.M., K. Podolak, and A. Gaffney (editors). 2010. From High Rise to Coast: Revitalizing Ribeira da Barcarena. Water Resources Center Report No.210, and Report WP 2010-01, Institute of Urban and Regional Development, and Institute of European Studies Publication 1102, University of California, Berkeley. online at *http://iurd.berkeley.edu/catalog/Working_Paper_Titles/High_Rise_Coast_Revitalizing_Ribeira_da_Barcarena* and at *http://escholarship.org/uc/item/3q77s4ss#page-2*

Kondolf, G.M., P. Carling, F. Fruchart, & C. Alford. 2010. Potential Post-Dam Changes in Sediment Supply and Channel Form in the Lower Mekong River: A Preliminary Assessment. Prepared for the Mekong River Commission Secretariat, Vientiane, February 2010

Mekong River Commission. 2009. *Design guidelines for Mekong Mainstem Dams*. (contributed approximately half of this document, specifying approaches for managing sediment in reservoirs) March 2009.

Kondolf, G.M. 2009. Restoration prospects for the Apalachicola River. Rept to American Rivers,Washington DC.

Kondolf, G.M. 2009. Guidelines for sand and gravel mining in Korean Rivers. Report submitted to K-Water (Korean Water Agency), May 2009.

Natali, J., G.M. Kondolf, C. Landeiro, J. Christian-Smith, S. Scheuer, and T. Grantham. 2009. A Living Mediterranean River: Restoration and Management of the Rio Real in Portugal to Achieve Good Ecological Condition. Available online at *http://repositories.cdlib.org/wrc/contributions/209*

Skabelund, L., G.M. Kondolf, C. Johnson, and A. Bukojemsky. 2009. Successful ecological restoration: A framework for planning/design professionals. American Association of Landscape Architects, Washington DC.

Kondolf, G.M., Tompkins, M.R, and McBain & Trush, Inc. 2008. Lower Deer Creek Ecosystem Restoration and Flood Management: Feasibility Study and Conceptual Design Project: Geomorphic and Biological Monitoring Report. Report to Deer Creek Watershed Conservancy, Vina, California.

Grantham, T., J. Christian-Smith, G.M. Kondolf, and S. Scheuer. 2008. A Fresh Perspective for Managing Water in California: Insights from Applying the European Water Framework Directive to the Russian River. Water Resources Center Report 208. on line: http://www.lib.berkeley.edu/WRCA/WRC/pubs_contri.html#208

Kondolf, G. M. and Stillwater Sciences. 2007. Sacramento River Ecological Flows Study: Off-Channel Habitat Study Results. Technical Report prepared for The Nature Conservancy, Chico, California, online at: http://www.delta.dfg.ca.gov/erp/sacriverecoflows.asp

Gohar, A., and G.M. Kondolf. 2007. Flooding risks in El-Sheikh el-Shazli. Report to US Agency for International Development, Cairo, September 2007.

Anderson, S., R. Jencks, G.M. Kondolf, J. Natali, and G. Saraiva. 2007. New life for urban streams: strategies for revitalizing waterways in the Lisbon metropolitan region. Report published by the Department of Landscape Architecture, University of California, Berkeley, and the Luso-American Fund for Development, Lisbon, May 2007. Online at http://ies.berkeley.edu/psp/portuguesestudies/research.html#streams

Eisenstein, W., G.M. Kondolf, and J.R. Cain. 2007. *ReEnvisioning the delta: alternative futures for the heart of California*. Institute for Urban and Regional Development, University of California, Berkeley. Available online at: http://landscape.ced.berkeley.edu/~delta/

National Research Council. 2007. *Hydrology, Ecology, and Fishes of the Klamath River Basin*. (member of committee, contributed to sections on models, Klamath River, and evaluation of water balance model and instream flow model) available online at: http://dels.nas.edu/dels/viewreport.cgi?id=4794

H.T. Harvey and Associates and G. M. Kondolf. 2006. Stony Creek Watershed Assessment, Volumes I (Lower Stony Creek Watershed Analysis) and II (Existing Conditions). Report to Glenn County Resource Conservation District, Willows, California.

National Park Service. 2006. Point Reyes National Seashore Water and Aquatic Resources Stewardship Plan, Draft. (co-authored with L. Pagano, B.Ketcham, D. Vana-Miller). Point Reyes National Seashore, California.

Kondolf, G.M. 2005. Expert report of Professor G. Mathias Kondolf, PhD. Submitted in NRDC et al. vs. US Bureau of Reclamation. (Assessment of restoration potential of San Joaquin River below Friant Dam, Aug 2005)

RECENT AWARDS AND FELLOWSHIPS

Fellow of the Landscape Architecture Foundation, Washington DC.

Clarke Scholar at the Institute for Water Resources, US Army Corps of Engineers, Washington DC, 2011.

Council of Educators in Landscape Architecture. Award of Distinction, 2007.

Fulbright Commission, senior scholar research award to conduct research on environmental river management in Portugal, University of Lisbon, Mar-May 2001.

Fulbright Commission, senior scholar research award to conduct research on the Eygues River, France, 1997-1998.

RESUME
CURRICULUM VITAE

ERIC W. LARSEN
Associate Research Scientist
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Landscape Architecture Program
University of California, Davis
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UC Davis Department of Human Ecology
119 Hunt Hall
One Shields Avenue, Davis, CA 95616

EDUCATION

Ph.D. Civil Engineering, Environmental Water Resources Division. Department of Civil Engineering. University of California, Berkeley, 1995. Berkeley, California, 94701.
Dissertation Title: "Mechanics and Modeling of River Meander Migration."
Major: Civil Engineering-Water Resources; Minors: Fluvial Geomorphology, Mathematics.

M.S. Civil Engineering, Environmental Water Resources Division. Department of Civil Engineering. University of California, Berkeley, 1986. Berkeley, California, 94701.

B.A. Engineering and Applied Physics, Harvard University, 1969. Cambridge**,** Massachusetts, 02138.

High school San Rafael High School, San Rafael, California. Graduated 1965.

PROFESSIONAL EXPERIENCE

Research Scientist (November 1994-date)
UC Davis
Department of Human Ecology
Environmental Design Department and Landscape Architecture Program
Geology Department
Civil Engineering Department

I have used my expertise in fluvial geomorphology to develop an interdisciplinary research program, publication record, and applied projects that address vital issues in river management, habitat formation and water quality, with an emphasis on the restoration of habitats for fish, wildlife and riparian vegetation. As a research scientist, private consultant and senior technical advisor, I am also active in using my expertise to help with geomorphic and water resource

planning, and with executing various stakeholder meetings, project planning efforts, and other deliberative processes related to water resource issues for fish, wildlife, and riparian habitat.

I have served as a science advisor for many public agencies and private groups, including the US Bureau of Reclamation, the US Department of Justice, the California State Attorney General's office, the California Tahoe Conservancy, the California Department of Water Resources, the CALFED California Bay-Delta Authority, the National Audubon Society, The Water Heritage Trust (San Francisco), a work group of State and Federal Agencies advising the UC Army Corps of Engineers on their Sacramento River Bank Protection Program, and a multi-agency technical advisory group for Sacramento River Off-stream Storage (North of Delta Off-stream Storage), a $2 billion State of California project. I have been a science advisor to CALFED on several projects involving the Sacramento River, including major planning issues related to pumping plant placement (M and T pumping plant, and Llano Seco Riparian Sanctuary project). I have collaborated with two non-profit organizations, The Nature Conservancy and River Partners, on separate projects. Another independent research project of mine was a component of the Sacramento River Ecological Flows Study, which is being led by The Nature Conservancy (TNC) with funding from the California Bay-Delta Authority's Ecosystem Restoration Program (CALFED grant ERP-02D0P61).

I have taught workshops on a variety of subjects for groups, including the US Army Corps of Engineers, Yolo County Resource Conservation District, the California State Water Resources Control Board, the California Department of Water Resources, and the California State Parks system. I have given numerous talks and presentations to state and federal agencies. I continue to teach an annual short-course to the U.S. Army Corps of Engineers Hydrologic Engineering Center (HEC) on watershed processes, fluvial geomorphology, and hydrologic/geomorphic modeling.

My primary research focus has been to establish an interdisciplinary research program that addresses pressing issues in river management and restoration. Collaborating with colleagues and students from a wide range of disciplines, I have developed new techniques to analyze river channel bank erosion and river meander migration. The results have major implications for river channel management because they can help predict areas of riparian habitat formation. This research not only adds to the existing body of knowledge regarding the relationship between bank erosion, channel migration, and habitat formation, but also advances the field by introducing new techniques for modeling changing (or regulated) river flows and their effects on habitat formation. I am in the process of expanding this work; my colleagues and I are developing a comprehensive model that integrates river flow rate, channel migration, and riparian vegetation recruitment and establishment.

As a consulting technical advisor in fluvial geomorphology and hydraulic engineering, I apply my expertise in river mechanics in coordination with numerous consulting firms, state and federal agencies, and non-profit groups. I have been involved in many projects that evaluate the impact of changing river processes on water quality, fisheries and other focal species. I have helped develop methodologies to assess such impacts for a range of governmental and non-governmental organizations.

As the advising geomorphologist to the Yolo County Board of Supervisors and the Yolo County Department of Parks and Resources, I am involved with planning and executing stakeholder meetings, project planning efforts, and other meetings held as part of deliberative processes related to the resource issues of Cache Creek and Yolo County. I am responsible for public

meeting agendas and summaries, and am also responsible for reviewing and approving interim and final agreements, and action plans related to the water resources of Cache Creek. I was also appointed (2007-2013) by the City of Winters City Council as a member of the Winters Putah Creek Committee, which serves and advises the City Council.

I have written quantitative geomorphic/hydraulic mathematical models utilizing hydraulic and hydrologic mathematical programs and models, and use ARCGIS for modeling and data presentation.

PUBLICATIONS

1. 2000 Kondolf, G.M., E.W. Larsen, and J.G. Williams. 2000. *Measuring and Modeling the Hydraulic Environment for Assessing Instream Flows.* North American Journal of Fisheries Management 20:1016-1028.

2. 2002 Larsen, E.W. and S.E. Greco. 2002. Modeling Channel Management Impacts on River Migration: A Case Study of Woodson Bridge State Recreation Area, Sacramento River, California, USA. Environmental Management 30(2):209-224.

3. 2003 Golet, G.H., D.L. Brown, E.E. Crone, G.R. Geupel, S.E. Greco, K.D. Holl, D.E. Jukkola, G.M. Kondolf, E.W. Larsen, F.K. Ligon, R.A. Luster, M.P. Marchetti, N. Nur, B.K. Orr, D.R. Peterson, M.E. Power, W.E. Rainey, M.D. Roberts, J.G. Silveira, S.L. Small, J.C. Vick, D.S. Wilson, and D.M. Wood. 2003. *Using Science to Evaluate Restoration Efforts and Ecosystem Health on the Sacramento River Project, California.* In P.M. Faber (editor). 2001 Riparian Habitat and Floodplains Conference Proceedings, Sacramento, CA. Riparian Habitat Joint Venture, 368-385.

4. 2004 Micheli, E.R., J.W. Kirchner, and E.W. Larsen. 2004. Quantifying the Effect of Riparian Forest Verses Agricultural Vegetation on River Meander Migration Rates, Central Sacramento River, California, USA. River Research and Applications, 20:537-548.

5. 2004 Rains, M.C., J.F. Mount, and E.W. Larsen. 2004. Simulated Changes in Shallow Groundwater and Vegetation Distributions under Different Reservoir Operations Scenarios. Ecological Applications, 14(1):192-207.

6. 2004 Rains, M.C., J.F. Mount, and E.W. Larsen. 2004. *Local Shallow Groundwater Drawdown and Baseflow Cessation Due to Regional Groundwater Pumping.* In R. Lowrance (editor). Riparian Ecosystems and Buffers: Multi-Scale Structure, Function, and Management. 2004 AWRA Summer Specialty Conference Proceedings, Olympic Valley, California. American Water Resources Association, Middleburg, Virginia, 1-6

7. 2006 Larsen, E.W., E.H. Girvetz and A.K. Fremier. 2006. Assessing the Effects of Alternative Setback Channel Constraint Scenarios Employing a River Meander Migration Model. Environmental Management, 37(6):880-897.

8. 2006 Golet, G.H., M.D. Roberts, E.W. Larsen, R.A. Luster, R. Unger, G. Werner and G.G. White. 2006. Assessing Societal Impacts when Planning Restoration of Large Alluvial Rivers: A Case Study of the Sacramento River Project, California. Environmental Management, 37(6):862-879.

9. 2006 Stubblefield, A.P., M.I. Escobar and E.W. Larsen. 2006. *Retention of Suspended Sediment and Phosphorus on a Freshwater Delta, South Lake Tahoe, California*. Wetlands Ecology and Management, 14:287-302.

10. 2006 Larsen, E.W., A.K. Fremier and S.E. Greco. 2006. *Cumulative Effective Stream Power and Bank Erosion on the Sacramento River, California, USA.* Journal of American Water Resources Association, 42(4):1077-1097.

11. 2006 Larsen, E.W., A.K. Fremier, and E.H. Girvetz. 2006. Modeling the Effects of Variable Annual Flow on River Channel Meander Migration Patterns, Sacramento River, CA, USA. Journal of American Water Resources Association, 42(4):1063-1075.

12. 2006 Yarnell, S., J.F. Mount, E.W. Larsen. 2006. The Influence of Relative Sediment Supply on Riverine Habitat Heterogeneity. Geomorphology, 80:310-324.

13. 2007 Larsen, E.W., E.H. Girvetz and A.K. Fremier. 2007. Landscape Level Planning in Alluvial Riparian Floodplain Ecosystems: Using Geomorphic Modeling to Avoid Conflicts between Human Infrastructure and Habitat Conservation. Landscape & Urban Planning, 79:338-346.

14. 2007 Greco, S.E., A.K. Fremier, E.W. Larsen, and R.E. Plant. 2007. A Tool for Tracking Floodplain Age Land Surface Patterns on a Large Meandering River with Applications for Ecological Planning and Restoration Design. Landscape and Urban Planning, 81:354-373.

15. 2008 Dixon, M.D., J.C. Stromberg, J. Price, H. Galbraith, A.K. Fremier, and E.W. Larsen. In press. The Potential Effects of Climate Change on the Upper San Pedro Riparian Ecosystem: Boon or Bane? (Chapter 3). In: J. Stromberg and B. Tellman (Editors), Riparian Area Conservation in a Semi-Arid Region: The San Pedro River Example. University of Arizona Press.

16. 2008 Greco, S.E., Girvetz, E.H., Larsen, E.W., Mann, J.P., Tuil, J.L., Lowney, C., 2008. Relative elevation topographic surface modeling of a large alluvial river floodplain and applications for the study and management of Riparian landscapes. Landscape Research 33, 461–486.

17. 2010 Micheli, E.R. and E.W. Larsen River Channel Cutoff Dynamics, Sacramento River, California, USA. River Research and Applications. n/a. doi: 10.1002/rra.1360. http://onlinelibrary.wiley.com/doi/10.1002/rra.1360/abstract.

LIMITED DISTRIBUTION: REPORTS

1. 1985 Larsen, E.W., Philip Williams and Associates. *Rush Creek Marsh Enhancement Plan.* Report prepared for Marin Co. Open Space. pp. 1-82.

2. 1988 Shen, H.W. and E.W. Larsen. *Migration of the Mississippi River.* Report for the Waterways Experiment Station, U.S. Army Corps of Engineers, Vicksburge, Mississippi. pp. 1-121.

3. 1991 Larsen, E.W. *Parker Creek Plug Bed Mobility Analysis and Data, Mono County, California.* pp. 1-67.

4. 1991 Larsen, E.W. and others. *Parker Creek Plug Restoration Plan*. pp. 1-21 with appendices.

5. 1992 Larsen, E.W., Trihey & Associates. *Description and evaluation of Restoration Alternatives for Lower Lee Vining Creek, Mono County, California.* pp. 1-71.

6. 1992 Larsen, E.W. *Bed Surface and Subsurface Particle Size Characterization, Rush Creek, Mono County, California.* pp. 1-188.

7. 1992 Larsen, E.W. *Bed Surface and Subsurface Particle Size Characterization. Lee Vining Creek, Mono County, California.* pp. 1-260.

8. 1992 Larsen, E.W. and others, Trihey & Associates. *Comparison of Historic and Existing Conditions on Lower Lee Vining Ceek, Mono County, California* 1-86.

9. 1992 Larsen, E.W. *1992 Pilot Project Treatment for Lee Vining Ceek, Mono County, Californi*a. pp. 1-35.

10. 1992 Larsen, E.W. *Stability of Bar-Pool Pilot Projects, Lee Vining Ceek, Mono County, California. pp.* 1-56.

11. 1992 Larsen, E.W., Trihey & Associates. *Overview of Representative 1992 Restoration Treatments, Lee Vining Ceek, Mono County, California.* pp. 1-41.

12. 1993 Larsen, E.W., Trihey & Associates. *Summary Comparison of Pre-1941 and Post-1941 Conditions Affecting Fish Populations in Lower Rush Creek, Mono County, California. pp.* 1-114.

13. 1994 Larsen, E.W. *A Study of Pool Morphology in Pre-1941 Channel Segments of Lower Rush Creek, Mono County, California.* pp. 1-78.

14. 1999 Rutten, L.T., J.F. Mount and E.W. Larsen. *Quantitative assessment of the response to changing sediment supply, North Fork, American River, California.* Technical Completion Report. Part of Water Resources Center Project UCAL-WRC-W-788.

15. 1999 Kondolf, M., T. Griggs, E.W. Larsen, S. McBain, M. Tompkins, J. Williams and J. Vick. *Flow Regime Requirements for Habitat Restoration along the Sacramento River between Colusa and Red Bluff.* CALFED Bay-Delta Program. SAC/136472/JAN00/002.DOC.

16. 1999 Larsen, E.W., J. Fleckenstein and E.G. McPherson. *Investigation into Hydrologic Modeling and the Effect of Urban Forests on Runoff Quantity and Quality.* United States Department of Agriculture. Forest Service. Pacific Southwest Research Station. Center for Urban Forest Research. Internal Report Hydro-1, DRAFT.

17. 1999 Magney D., M. Rains and E.W. Larsen. David Magney Environmental Consulting. 1999. *Harrison Property Bank Stabilization Assessment on San Antonio Creek, Ojai Valley, California.* (PN 99-0081). Prepared for the U.S. Army Corps of Engineers, Ventura, California.

18. 2002 Larsen, E.W., E. Anderson, E. Avery and K. Dole. *The Controls on and evolution of channel morphology of the Sacramento River: A case study of River Miles 201-185.* Report to the Nature Conservancy. November 1, 2002.

19. 2004 Larsen, E.W. and A. Fremier. 2004. *Identification of Riparian and Wetland Vegetation Dependent on Water Supplied by the Amador Canal and An Analysis of Dependence of Jackson Creek Flows on Flow in the Amador Canal.* Report prepared for the Law Offices of J. William Yeates, Attorney-at-Law.

20. 2004 Larsen, E.W. *Meander Bend And Gravel Bar Migration Near River Mile 192.75 Of The Sacramento River.* 2004. Phase I report prepared for CALFED Ecosystem Restoration Program, Agreement #ERP-02-PO8-D, Amendment 2. Steering Committee Technical Memorandum.

21 2005 Larsen, E.W. *Future Meander Bend Migration and Floodplain Development Patterns near River Miles 241 To 235, Sacramento River.* 2005. Report prepared for River Partners, Technical Memorandum for CALFED Ecosystem Restoration Program, Agreement #ERP-02-P39.

22. 2005 Larsen, E.W. *Meander Bend Migration Near River Mile 178 of the Sacramento River.* 2005. Report prepared for River Partners, Technical Memorandum for CALFED Ecosystem Restoration Program, Agreement #ERP-02-P39.

23. 2005 Larsen, E.W. *Future Meander Bend Migration And Floodplain Development Patterns Near River Miles 200 To 191 Of The Sacramento River.* 2005. Phase II report prepared for CALFED Ecosystem Restoration Program, Agreement #ERP-02-PO8-D, Amendment 2. Steering Committee Technical Memorandum.

24. 2004 Larsen, E.W. *Meander Bend Migration near River Mile 178 of the Sacramento River.* 2004. Report for river Partners, Chico, California.

25. 2005 Larsen, E.W. *Future Meander Bend Migration and Floodplain Development Patterns near River Mile 241 to 235, Sacramento River.* 2005. Report for River Partners, Chico, California.

26. 2005 Larsen, E.W. *Future Meander Bend Migration And Floodplain Development Patterns Near River Miles 200 To 191 Of The Sacramento River.* 2005. Phase III report prepared for CALFED Ecosystem Restoration Program, Agreement #ERP-02-PO8-D, Amendment 2. Steering Committee Technical Memorandum.

27. 2006 Winter, S.M. and E.W. Larsen. *Sediment Retention on a Deltaic Floodplain in Response to Climate and Land-Use Changes.* 2006. Report for the California Tahoe Conservancy.

28. 2006 Young, A, E.W. Larsen, E. Girvetz and A. Fremier. *Evaluating River Restoration Design Using a Meander Migration Model on the Trinity River, California.* 2006. Report for the Department of Water Resources.

29. 2006 Larsen, E.W. and M. Rains. *Meander Migration Model Assessment for The 50-And 100-Year Storms,Whitman Property, San Antonio Creek, Ventura County, California.* Coshow Environmental, INC.

30. 2006 Larsen, E.W. and M. Rains. *Meander Migration Model Assessment for The January 2005 Storm, Whitman Property, San Antonio Creek, Ventura County, California.* 2006. Coshow Environmental, INC.

31. 2007 Larsen, E.W. *Predicting Modes and Magnitude of River Channel Migration and Chute Cutoff Based on Bend Geometry, Sacramento River, California, USA.* Final Report for the U. S. Bureau of Reclamation. Sacramento, CA.

32. 2007 Larsen, E.W. *Sacramento River Ecological Flows Study: Meander Migration Modeling.* Final Report. Prepared for CALFED Ecosystem Restoration Program. Sacramento, CA. 102 pp. http://132.241.99.23/SRCAF/library_doc/Meander_Migration_Modeling_Final_Report_(Larsen_2007).pdf

33. 2008 Larsen, E.W. *Modeling Revetment Removal and Implications for Meander Migration of Selected Bends River Miles 222 To 179 of the Sacramento River*. Phase III report prepared for CALFED Ecosystem Restoration Program, Agreement #ERP-02-PO8-D, Amendment 2. Steering Committee Technical Memorandum.

34. 2008 Larsen, E.W. *Simulated Channel Migration (2007-2057) near River Miles 197 To 191 of the Sacramento River.* Phase III report prepared for CALFED Ecosystem Restoration Program, Agreement #ERP-02-PO8-D, Amendment 2. Steering Committee Technical Memorandum.

35. 2008 Larsen, E.W. *Chinook Bend Channel Migration Modeling Study*. Prepared for King County Department of Natural Resouces and the Wild Fish Conservancy, Seattle, Washington.

36. 2009 Larsen, E.W. *Rumsey Rancheria Flood Inundation Technical Study.* Prepared for James Zanetto, Architect & Planner and Rumsey Indian Rancheria.

37. 2010 Larsen, E.W. *Llano Seco Riparian Sanctuary Channel Study: Meander Bend Migration and Cutoff Modeling.* Final Report. Prepared for River Partners. CALFED Ecosystem Restoration Program. Sacramento, CA.

38. 2010 Larsen, E.W. *Sacramento River Ecological Flows Study: HEC-RAS cross sections and matching stage-discharge curves for use in the SacEFT v.2 model of riparian initiation.* Final Report. Prepared for ESSA Technologies. CALFED Ecosystem Restoration Program. Sacramento, CA.

39. 2010 Larsen, E.W. *Review Summary of Selected Software Packages for Ecosystem Habitat and Attribute Modeling.* Prepared for USACE Engineer Research and Development Center (ERDC). Vicksberg, Mississippi

40. 2010 Larsen, E.W. *Modeling Response to Flow Changes for Cottonwood Initiation and Chinook salmon redd dewatering on the Upper Sacramento River With Environmental Flow and Ecosystem Processes Modeling Software Packages.* Prepared for USACE Hydrologic Engineering Center (HEC). Davis, CA.

41. 2011 Larsen, E.W., T. Horner, E. Ringleberg, *Cache Creek Annual Status Report 2011*. Prepared for Yolo County Board of Supervisors and Natural Resources Division, Woodland CA.

GREGORY B. PASTERNACK DEPARTMENT OF LAND, AIR, AND WATER RESOURCES
UNIVERSITY OF CALIFORNIA AT DAVIS
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EDUCATION

Ph.D., Environmental Engineering, The Johns Hopkins University, Baltimore, MD, 1998
M.S., Environmental Water Resources Engineering, University of California, Berkeley, CA, 1994
B.A., Earth Science; Science in Society, Wesleyan University, Middletown, CT, 1993.

PROFESSIONAL ACADEMIC EXPERIENCE

2011- **Chair**, Hydrologic Sciences Graduate Group, University of California, Davis
2006- **Professor,** Land, Air, and Water Resources, University of California, Davis
2009- Editorial Board Member, Geomorphology
2004-2009 **Associate Editor**, Water Resources Research
2002-2006 **Associate Professor**, Land, Air, and Water Resources, University of California, Davis
1998-2002 **Assistant Professor**, Land, Air, and Water Resources, University of California, Davis

PROFESSIONAL CONSULTING EXPERIENCE (SOLE PROPRIETOR)

2013- **Channel stability assessment contractor**, Yuba City, CA
•Performed studies in collaboration with PWA ESA to determine the best location for a new wastewater outfall pipe in the Feather River near Yuba City. Studies included historical geomorphic analysis, bathymetric mapping, topographic change detection for 1999-2013, 2D hydrodynamic modeling, and water level monitoring.

2008- **River management and assessment contractor**, Yuba River RMT, Yuba City, CA.
•Collaborated on developing a river monitoring and evaluation framework for the lower Yuba River.
•Wrote data collection and analysis protocols for geomorphology, hydraulics, and fish studies.
•Led development of high-resolution Digital Elevation Model of the river corridor.
•Led development and usage of spatially comprehensive, 1-m resolution 2D hydraulic model of the lower Yuba River.
•Wrote reports related to physical processes and physical habitat on the lower Yuba River.
•Contributed to the RMT's interrim M&E report.

2010-2012 **River rehabilitation contractor**, USACE, Sacramento, CA
•Performed studies and wrote the Gravel Augmentation Implementation Plan for gravel/cobble addition to the lower Yuba River below Englebright Dam.
•Wrote a review of the 2012 Biological Opinion of the U. S. Army Corps of Engineers Ongoing Operation and Maintenance of Englebright Dam and Reservoir, and Daguerre Point Dam on the Lower Yuba River

2009 **River assessment contractor,** USACE, Sacramento, CA
•Performed studies and wrote technical report related to the current status of the November 2007 injection of gravel into the Englebright Dam Reach on the Lower Yuba River.

2007-2008 **River rehabilitation subcontractor**, MWH Americas, Inc., Sacramento, CA
•Provided 2D hydraulic models, geomorphic analysis, and design guidance for spawning habitat rehabilitation on the Lower Feather River, CA.

2002-2003 **River rehabilitation subcontractor**, Fall Creek Engineering, Inc., Santa Cruz, CA
•Provided geomorphic analysis and design guidance for stream channel restoration in a steep mountain river near Livermore, CA.

2002 **Hydrology and hydraulics subcontractor**, Larry Walker Associates, Davis, CA
•Evaluated mechanical mixing mechanisms and effectiveness of Shanghai Falls in diluting Yuba City municipal wastewater.

2002 **Geomorphology scientific reviewer**, South Florida Water Management District, West Palm Beach, FL
•Evaluated geomorphic analysis of landform origin and evolution in the Everglades system.

1997-1998 **Geomorphologist subcontractor**, TRC Garrow Associates, Inc., Chapel Hill, NC.
•Determined the age and environmental suitability of coastal landforms and facies on Delmarva Peninsula for pre-historic human habitation.
•Assessed geomorphology of archeological sites along pending highway construction sites.

UNIVERSITY COURSES TAUGHT

SAS004 Water and Popular Culture;
HYD143 Hydrological Processes in Ecosystems
HYD151 Field Methods in Hydrology
HYD252 Hillslope Geomorphology and Sediment budgets
HYD254 Ecohydraulics
HYD256 Geomorphology of Estuaries and Deltas

PROFESSIONAL AFFILIATIONS

American Geophysical Union, Consortium of Universities For the Advancement of Hydrologic Science, River Management Society, Estuarine Research Federation, American Society of Civil Engineers, Society of Wetland Scientists, Universities Council on Water Resources, American Canoe Association, Sigma Xi Research Society.

AWARDS (abbreviated)

Editors' Citation for Excellence in Refereeing for Water Resources Research (2012)
Editors' Citation for Excellence in Refereeing for Water Resources Research (2010)
Certificate of Appreciation for Wetland Research, NOAA (1998)
Certificate of Appreciation for Outstanding Research, State of Maryland (1998)

PATENTS

1. Pasternack, G. B., Valle, B. L, Paige, D., Shaw, M. 2006. Portable apparatus and method for measuring hydraulic features in rivers and streams. United States Patent Office, Patent #7062962.

BOOKS

1. Pasternack, G. B. 2011. 2D modeling and ecohydraulic analysis. Createspace: Seattle, WA.

PUBLICATIONS IN REFEREED JOURNALS

59. Watson, E.B., Pasternack, G.B., Gray, A.B., Goni, M. 2013. Particle size characterization of historic sediment deposition from a closed estuarine lagoon, Central California. Estuarine, Coastal and Shelf Science 126:23-33. http://dx.doi.org/10.1016/j.ecss.2013.04.006.

58. Carley, J. K., Pasternack, G. B., Wyrick, J. R., Barker, J. R., Bratovich, P. M., Massa, D. A., Reedy, G. D., Johnson, T. R. 2012. Significant decadal channel change 58–67 years post-dam accounting for uncertainty in topographic change detection between contour maps and point cloud models. Geomorphology, doi:10.1016/j.geomorph.2012.08.001.

56. Escobar-Arias, M. I. and Pasternack, G. B. 2011. Differences in River Ecological Functions Due to Rapid Channel Alteration Processes in Two California Rivers Using the Functional Flows Model, Part 2- Model Applications. River Research and Applications 27:1-22, doi: 10.1002/rra.1335.

55. Watson, E.B., Wasson, K., Woolfolk, A., Van Dyke, E., Gray, A.B., Pasternack, G.B., Reidy, L.M., Pakenham, A., Wheatcroft, R. 2010. Applications from paleoecology to environmental management and restoration in a dynamic coastal environment. Restoration Ecology, doi: 10.1111/j.1526-100X.2010.00722.x.

54. White, J. Q., Pasternack, G. B., and Moir, H. J. 2010. Valley width variation influences riffle-pool location and persistence on a rapidly incising gravel-bed river. Geomorphology 121:206-221.

53. Senter, A. E. and Pasternack, G. B. 2010. Large wood aids spawning Chinook salmon (Oncorhynchus tshawytscha) in marginal habitat on a regulated river in California. River Research and Applications, DOI: 10.1002/rra.1388.

52. Escobar-Arias, M. I. and Pasternack, G. B. 2010. A Hydrogeomorphic Dynamics Approach to Assess In-Stream Ecological Functionality Using the Functional Flows Model, Part 1 – Model Characteristics. River Research and Applications 26:1103-1128, doi: 10.1002/rra.1316.

50. Moir, H. J. and Pasternack, G. B. 2010. Substrate requirements of spawning Chinook salmon (*Oncorhynchus tshawytscha*) are dependent on local channel hydraulics. River Research and Applications 26:456-468.

49. Wheaton, J. M., Brasington, J., Darby, S., Merz, J. E., Pasternack, G. B., Sear, D. A., Vericat, D. 2010. Linking geomorphic changes to salmonid habitat at a scale relevant to fish. River Research and Applications 26:469-486.

48. Gray, A. B., Pasternack, G. B., Watson, E. B. 2010. Hydrogen peroxide treatment effects on the particle size distribution of alluvial sediments. The Holocene 20:2:293-301.

46. Sawyer, A. M., Pasternack, G. B., Moir, H. J., Fulton, A. A. 2010. Riffle-Pool Maintenance and Flow Convergence Routing Confirmed on a Large Gravel Bed River. Geomorphology 114:143-160.

44. Brown, R. A. and Pasternack, G. B. 2009. Comparison of Methods for Analyzing Salmon Habitat Rehabilitation Designs For Regulated Rivers. River Research and Applications 25:745-772.

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7. Pasternack, G. B. 2010. Gravel/Cobble Augmentation Implementation Plan (GAIP) for the Englebright Dam Reach of the Lower Yuba River, CA. Prepared for the U.S. Army Corps of Engineers.

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EDUCATION

- Ph.D. - Earth Resources, Colorado State University, 1988
- M.S. - Earth Resources, Colorado State University, 1985
- B.S. - Geology, University of Washington, 1975

POSITIONS HELD

2007-present: Professor, Geography Department, University of Colorado-Boulder

1997-2007: Associate Professor, Geography Department, University of Colorado-Boulder

1998-present: Affiliate, Environmental Studies Program, University of Colorado-Boulder

1992-present: Research Affiliate (Geophysics), INSTAAR, University of Colorado-Boulder

1990-1997: Assistant Professor, Geography Department, University of Colorado, Boulder

1988-1990: Post-Doctoral Research Associate, U.S. Geological Survey Cascades Volcano Observatory, Vancouver, WA

SERVICE on NATIONAL COMMITTEES and EDITORIAL BOARDS

National Research Council, Board on Environmental Studies and Toxicology, Committee on Hydrology, Ecology, and Fishes of the Klamath River Basin, 2006-pres.

National Research Council, Water Science and Technology Board, Committee on River Science at the US Geological Survey, 2004-pres.

US Fish and Wildlife Service San Juan River Basin Recovery Implementation Program, Peer Review Panel, 2001-pres.

Associate Editor, *Water Resources Research*, 1994-1999

Associate Editor, *Journal of Geophysical Research-Earth Surface*, 2009-pres.

Member, AGU Erosion and Sedimentation Committee, 1991-95

AWARDS

- Fellow, Geological Society of America, 2012
- Editor's Citation for Excellence in Refereeing, Water Resources Research, 1993, 2010
- National Research Council Postdoctoral Associate, 1988-90

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Geophysical Union
- Geological Society of America
- Ecological Society of America

PEER-REVIEWED PAPERS, BOOK CHAPTERS and REPORTS

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Mueller, E.R. and J. Pitlick, Landscape controls on sediment supply and channel pattern: northern Rocky Mountains, USA (in preparation for *Journal of Geophysical Research-Earth Surface*)

Segura, C. and J. Pitlick, Spatial variability of boundary shear stress and sediment-transport intensity at the reach scale (in preparation for *Water Resources Research*).

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Appendix B – No Conflict-of-Interest Forms

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NO CONFLICT-OF-INTEREST FORM

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

Independent Scientific Advisory Committee (ISAC)

Guidance regarding avoiding conflicts-of-interest was developed in accordance with the Scientific Peer Review Guidelines contained in the Platte River Recovery Implementation Program's (PRRIP) Adaptive Management (AM) Plan (Appendix A). Conflicts-of-interest include but are not limited to:

- Financial interest in the restoration activities associated with the PRRIP
- Familial relationship with any of the scientists conducting research and/or monitoring associated with the PRRIP
- Bias, for personal reason for or against the scientists mentioned above and/or the institutions involved in the implementation of the PRRIP
- Professional connection with any institutions involved with PRRIP implementation
- Impacts of lobbying or political pressure exerted by person(s) looking for a particular result or more work with the PRRIP

As a candidate proposed for participation on the ISAC, I hereby state that I ***do not*** have any conflicts-of-interest with the Platte River Recovery Implementation Program as outlined above and (if necessary) explained on the following page. I can serve effectively on the ISAC without any financial, familial, personal, or professional bias in order to further the goals of developing innovative ways to better manage the Platte River for the health of the ecosystem and the people that depend on it.

Robert M Dziuk — 29 Aug 2013

Proposed ISAC Candidate Signature — Date

NO CONFLICT-OF-INTEREST FORM

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

Independent Scientific Advisory Committee (ISAC)

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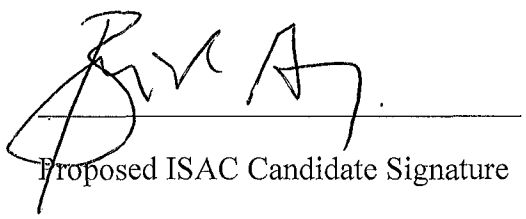

Proposed ISAC Candidate Signature

4 Sept 2013

Date

NO CONFLICT-OF-INTEREST FORM

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

Independent Scientific Advisory Committee (ISAC)

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- Impacts of lobbying or political pressure exerted by person(s) looking for a particular result or more work with the PRRIP

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8/20/2013

_____ _____

Proposed ISAC Candidate Signature Date

NO CONFLICT-OF-INTEREST FORM

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

Independent Scientific Advisory Committee (ISAC)

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Edmund D. Andrews — Sept 3, 2013

Proposed ISAC Candidate Signature — Date

Edmund D. Andrews

NO CONFLICT-OF-INTEREST FORM

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

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_____ _13 September 2013_____

Proposed ISAC Candidate Signature Date

NO CONFLICT-OF-INTEREST FORM

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

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Pierre Julien — 9/10/13

Proposed ISAC Candidate Signature — Date

NO CONFLICT-OF-INTEREST FORM

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

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Proposed ISAC Candidate Signature

20 Aug 2013

Date

NO CONFLICT-OF-INTEREST FORM

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

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Eric Larsen

_____ September 26, 2013

Proposed ISAC Candidate Signature Date

NO CONFLICT-OF-INTEREST FORM

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

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_____ ____9/9/13____

Proposed ISAC Candidate Signature Date

NO CONFLICT-OF-INTEREST FORM

PLATTE RIVER RECOVERY IMPLEMENTATION PROGRAM

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John Pitlick
University of Colorado

September 3, 2013