

Report as of FY2007 for 2007ID93B: "Idaho Water Resources Information and Needs Assessment: Extended Analysis and Enhanced Information Transfer"

Publications

Project 2007ID93B has resulted in no reported publications as of FY2007.

Report Follows

Statement of State Water Problem

With over 92,000 miles of rivers and streams and more than 100 lakes, water appears to be inexhaustible. However, the allocation of all of the surface water supplies, the current seven-year drought, transboundary issues surrounding aquifers, and increasing demand for water to protect ecosystem services has increased awareness of the state's limited water supply, as the interconnectedness of surface water and groundwater have become increasingly apparent with ongoing water shortages. Growing demand for water stems from multiple factors including urban population growth, agricultural needs, tribal water development, energy demand, habitat requirements, recreational use, and aesthetic values. Complicating these growing demands have been the recent droughts that affected the West during the late 1990's and early 2000's, which have been increasing previous stresses on aquifers and rivers caused by decades of groundwater pumping and changing irrigation practices. Idaho withdraws about 9 billion gallons of groundwater per day, four percent of which comprises 95 percent of public drinking water. Of the rest of the total groundwater withdrawn, 60 percent is used by agriculture, particularly sugar beets, potatoes, and barley, while the remaining 36 percent is used by industries that include aquaculture, food processing, fertilizer production and high-tech manufacturing. Five critical groundwater areas are located around the state and twelve groundwater management areas. Each area either has or is approaching insufficient groundwater supplies to provide a reasonably safe supply for irrigation or other uses at the current or projected rates of withdrawal.

These water supply issues have spurred the Idaho legislature and water management agencies to rethink management of the state's water resources. This project will enable Idaho's universities to focus their water resources research on responding to the challenges faced by the diverse water resource stakeholders. The proposed research would extend analysis and enhance information transfer for the results of a project conducted as part of a project initially funded by the Inland Northwest Research Alliance (INRA). The original INRA proposal explained the need to conduct a detailed but regional assessment of the information and research needs of water resource stakeholders related to increasing competition for scarce water supplies; the study, which was funded and is scheduled to end in May 2007, is assessing priorities for research on water resources in a five-state area, including AK, UT, WA, and MT as well as Idaho. Given the regional focus of this project, data generated are being compiled and analyzed primarily at a regional level. Therefore, the purpose of this proposal is to secure funding to analyze the results of the data generated in the State of Idaho at a more detailed, fine-grained level, and to disseminate the results of that analysis to appropriate publics and stakeholders across that state. The extended analyses of data already generated by 69 stakeholders within the state and the enhanced technical transfer of the analyses will provide universities, agencies, tribes, nongovernmental organizations, and private industry with focused priorities of needed research.

Statement of results or benefits.

Results and benefits of the proposed project can be tied to elements of Section 104(b) of the Water Resources Research Act of 1984, which requires that Institutes or Centers "plan, conduct, or otherwise arrange for competent research that fosters:

- (A) the entry of new research scientists into the water resources fields,
- (B) training and education of future water scientists, engineers, and technicians,"

Related results/benefits:

This project would further the training, experience and expertise of a recent Ph.D. and further the UI's WoW Initiative, which is building a WR Program to better educate future water scientists and engineers.

“(C) the preliminary exploration of new ideas that address water problems or expand understanding of water and water-related phenomena,”

Related results/benefits:

This project will provide universities, agencies, tribes, nongovernmental organizations, and private industry with focused priorities of needed research that addresses the challenges currently facing water resource managers and stakeholders. Analyses will be conducted on the data to identify commonalities among water resource management challenges and research needs at multi-levels including: state-level, ecoregion-level, agency-level, tribal-level, nongovernmental organization-level, and private industry-level.

As funding for research has become increasingly scarce in recent years, this information will enable water resource managers to: more effectively collaborate with university researchers; create partnerships among agencies, tribes, organizations, industries, and universities; and more efficiently target funding of prioritized research projects that have maximum future practical significance.

“and (D) the dissemination of research results to water managers and the public.”

Related results/benefits:

A press release and news conference would announce the availability of the results of this research, which would be distributed as a final report to all involved stakeholders and other interested publics. The report also would be made available for dissemination by the IWRRI, as well as on its Web-site and the sites of other water-related entities around the state of Idaho, including the UI Water Resources Program and the Idaho Departments of Water Resources and of Ecology, among others.

Nature, scope, and objectives of the project, including a timeline of activities.

This purpose of this project is to analyze the results of the data generated for a regional project at the state level and to disseminate the findings of the state analyses to universities, agencies, tribes, organizations, and private industry in Idaho. The objectives of this project include: (1) to analyze information generated through interviews with diverse water resource stakeholders throughout the State of Idaho, focusing on the research and information needs to address state-wide issues, such as drought and a secured water supply of high quality, in face of population growth and patterns of change in water availability, demand and use; and (2) to disseminate the results of the extended analysis to water resource stakeholders throughout the state, and to make the information publicly accessible. Analyses of water resource management challenges and information needs will employ thematic coding to assess the relative importance of the different information needs identified by the stakeholders.

Proposed Timeline of Activities

March 2007:

- Purchase qualitative analysis computer software
- Upload interview summaries
- Develop coding themes
- Assess the quality of coding themes through peer debriefing

April-May 2007:

- Code all interview summaries
- Establish inter-rater reliability of coded interview summaries
- Transcribe portions of interviews to develop examples of themes for report

May-June 2007:

- Write report; submit for peer-review
- Begin information transfer

June-July 2007:

- Complete report
- Continue and complete information transfer

Methods, procedures, and facilities

A hermeneutic approach to data analysis will be employed to facilitate the analysis of themes within interviews and themes across interviews, as the interpretation of text “is a circular relationship:” that is, the meaning of the whole emerges through understanding of its parts, while the parts, when considered holistically, synergistically create a whole that is greater than the sum of its parts (Gadamer, 1976). The qualitative analysis computer program QSR NVivo will be used to facilitate the thematic coding process and the compilation of text referencing each code. Thematic coding will be the primary method, with peer debriefing and multiple coders employed for quality assurance. Peer debriefing will be employed to develop codes for quality assurance. Additionally, inter-rater reliability will be employed after all of the texts are coded to ensure the quality of interpretations made upon the text (i.e., interview summaries), which will require 10% of the interview summaries to be coded (by a researcher who did not code all of the interview summaries) to establish a minimum of 90% agreement of coded text. Once trustworthiness of the coded themes is established via peer debriefing and inter-rater reliability, a qualitative methodology will be employed to analyze the emergent themes for each of these topics with a differential analysis: Analyses will be conducted on the data to identify commonalities at multi-levels including state-level, ecoregion-level, agency-level, tribal-level, nongovernmental organization-level, and private industry-level. A formal report will then be written documenting this analytical process and its results. That formal report will be submitted for peer review, as well as for formal comment by stakeholders and other interested publics, and a final draft prepared. It will be made available for dissemination by the IWRRI, as well as on its Web-site and those of other entities around the state of Idaho, including the UI Water Resources Program and the Idaho Departments of Water Resources and of Ecology, as well as water districts and watershed management groups, among others. A press release and news conference would announce the availability of the results.

Gadamer, H.-G. (1976). The historicity of understanding. In P. Connerton (Ed.), *Critical sociology: Selected readings* (pp. 117-133). Harmondsworth: Penguin Books Ltd.

Related research. (Research projects only)

Research has investigated and assessed needs relating to water and other natural resources; however, it has not done so at an in-depth, state-level level, where that analysis has focused on the region of the Inland Northwest. In particular, it has not analyzed these needs from the perspectives of different stakeholders and governmental agencies within a state, or across that state's different geographic regions. Examples of related literature include:

- Firth, P. L. (1998). Fresh water: Perspectives on the integration of research, education, and decision making. *Ecological Applications*, 8(3), 601-609.
- Jiagge, M. A. (1999). Information needs assessment. A case study of the information needs of staff of the Water Research Institute (CSIR). Dissertation submitted in partial fulfillment of the requirements for the Degree of Master of Arts in Library Studies, University of Ghana, Legon.
- Kavlock, R.J., Daston, G.P., DeRosa, C., Fenner-Crisp, P., Gray, L.E., Kaattari, S., Lucier, G., Luster, M., Mac, M.J., Maczka, C., Miller, R., Moore, J., Rolland, R., Scott, G., Sheehan, D.M., Sinks, T., and Tilson, H.A. (1996). Research needs for the risk assessment of health and environmental effects of endocrine disruptors: a report of the U.S. EPA-sponsored workshop. *Environmental Health Perspective*, 104(4), 715-740.
- Lawrence, A. W., Miller, J. A., and Hayes, T. D. (1995). Regional assessment of produced water treatment and disposal practices and research needs. SPE/EPA exploration & production. Environmental Conference, Houston TX, 27-29 March 1995, pp. 373-392.
- McCauley, D. J., DeGraeve, G. M., Linton, T. K. (2000). Sediment quality guidelines and assessment: Overview and research needs. *Environmental Science & Policy*, 3(1), 133-144.
- Nowak, P., Shepard, S., and Weiland, C. (1996). Utilizing a needs assessment in water quality program implementation for the Lake Mendota watershed. *The Farm Practices Inventory (FPI) Report 2*. Madison (WI): University of Wisconsin Environmental Resource Center.
- Scheraga, J. D., and Furlow, J. (2001). From assessment to policy: Lessons learned from the U.S. National Assessment. *Human Ecological Risk Assessment*, 7(5), 1227-1246.
- Smythe, K. D., Bernabo, J. C., Carter, T. B., and Jutro, P. R. (1996). Focusing biodiversity research on the needs of decision makers. *Environmental Management*, 20(6), 865-872.
- Taylor, J. S. (1989). *Assessment of potable water membrane applications and research needs*. Denver, CO: The Foundation: American Water Works Association.

Training potential

N/A

Investigators' qualifications

Charles C. Harris, Jr.

Professor of Environmental Management, Policy and Planning
Dept. of Conservation Social Sciences
CNR 19G
Moscow, ID 83844-1139
<http://www.uidaho.edu/css/chuckharris>

Phone: 208-885-6314
Fax: 208-885-6226
Email: charris@uidaho.edu

Academic Training

University of Michigan, Ann Arbor, Michigan, 1983, Ph.D., Natural Resources
Colorado State University, Ft. Collins, Colorado, 1978, M.S., Recreation Resources.
Oberlin College, Oberlin, Ohio, 1973, B.A., English Literature.

Appointments/Professional Experience

1998 - present. Professor, Department of Conservation Social Sciences, College of Natural Resources, University of Idaho.
1998 - present. Director and chair, Master of Natural Resources Program, College of Natural Resources, University of Idaho.
1996 – present. Member of Environmental Sciences Program faculty, University of Idaho. Serve on ES Core (Steering) Committee, attend ES Faculty meetings.
1984-1998. Assistant/Assoc. Professor, Dept. of Resource Recreation & Tourism, College of Natural Resources
1996 - present. Member of Environmental Sciences Program faculty, University of Idaho.

Related Publications

Cohen, K., N. Sanyal, L. Higgins & C. Harris. In process. Designing community coaching based program initiatives: A formative evaluation program model. *Journal of Extension*.
Cohen, K., N. Sanyal, & C. Harris. In process. Community coaching: Answering the call for innovative approaches to community-based development initiatives. *Journal of Program Planning & Evaluation*.
Smaldone, D., C.C. Harris, and N. Sanyal. In process. The role of time and locale in relation to place attachment. *J. of Leisure Research*.
Smaldone, D., C.C. Harris, and N. Sanyal. 2005. Place attachment and managing for critical park issues in Grand Teton National Park. *Journal of Park & Recreation Administration* 23 (1): 90-114.
Gustanski, J.A., Harris, CC., and Van Tassel, L. 2005. Cost-Effectiveness of Washington State's Grazing Program. Final Report. Joint Legislative Audit and Review Committee, Washington State Legislature.
Becker, D., Harris, C.C., E. Nielsen, and W.J. McLaughlin. 2004. A Comparison of a Technical and a Participatory Application of Social Impact Assessment. *Impact Assessment and Project Appraisal* 22(3): 177-189.
Harris, C.C., E. Nielsen, D. Becker, and W.J. McLaughlin. 2003. Innovative Community Assessments for Sustainable Resource Management: The Case of Salmon-Recovery on the Lower Snake River. *Impact Assessment and Project Appraisal*.21(2): 109-118.

- Becker, D., Harris, C.C., McLaughlin, W.J., and Nielsen, E. 2003. A Participatory Approach to Social Impact Assessment: The Interactive Community Forum. *Environmental Impact Assessment Review* 21(3): 367 – 382.
- Harris, C.C., P. Cook, J. O’Laughlin. 2003. Resource-Based Economic Development in Idaho and the Inland Northwest: Resource Management Policies and Community Impacts. Policy Analysis Group Report No. 22. Idaho Forest, Wildlife and Range Policy Analysis Group (PAG), University of Idaho, Moscow.
- Brown, G., P. Reed, and C.C. Harris. 2002. Testing a Place-Based Theory for Environmental Evaluation: an Alaska Case Study. *Applied Geography* 22(1): 49-76.
- Harris, C.C., W.J. McLaughlin, D.R. Becker and E.A. Nielsen. 2001. Impacts of Salmon Recovery Efforts on Towns and Cities in the Pacific Northwest of the U.S.: Results from a Community-Based C&I Assessment. In, A. Franc, O. Laroussinie, T. Karjalainen, (eds.), *Criteria and Indicators for Sustainable Forest Management at the Forest Management Unit Level*, pp. 29-44. European Forest Institute, Joensuu, Finland.
- Russell, K., and Harris, C.C. 2001. Dimensions of community autonomy in timber communities in the Inland Northwest. *Society and Natural Resources* 14: 21-38.
- Harris, C.C. (With Foster Wheeler Environmental Corporation) 2001. Analysis and evaluation of the “Recreation and Tourism Analysis” produced for the “Lower Snake River Juvenile Salmon Migration Feasibility Study: Feasibility Report and Environmental Impact Statement.” Study report completed for the U.S. Army Corps of Engineers, under contract to Foster Wheeler Environmental Corporation, Bothell, Washington. 112 pp. Available on-line: <<http://www.nww.usace.army.mil/lsr/products.htm>>
- Harris, C.C., McLaughlin, W.J., G. Brown, and D. Becker. 2000. An assessment of small rural communities in the Interior and Upper Columbia River basins. General Technical Report GTR-PNW-477. USDA Forest Service, Pacific Northwest Experiment Station, Portland.
- Harris, C.C., Brown, G., and W.J. McLaughlin. 1998. How resilient are rural communities in the Interior Columbia Basin Ecosystem? *Journal of Forestry* 96(2): 11-15.

Activities/Experience Relevant to Proposed Project

- Served as social scientist on numerous natural resource projects – currently on Steering Committee for UI Water Resources Program, and planning committee for Palouse Basin Water Summit.
- Apply sociology, social psychology and economics to variety of natural resource topics, including: Assessment of impacts of resource-management activities on Western communities; methods for resource conflict management and resolution; social impact assessment; recreation & amenity values, and regional economics of rural communities; rural community self-assessment conducted for the Interior Columbia Basin Ecosystem Management Project; community-based social impact assessment of proposed efforts to restore salmon populations in the lower Snake River; benefit-cost analyses of rangeland, recreation, & other resource management policies; organizational psychology of resource management agencies; comprehensive planning for Latah County & City of Moscow.
- Teaching has included courses on integrated planning, human dimensions of ecosystem management, restoration ecology, decision-making for watershed management, and resource economics and policymaking.

JAN BOLL

Contact Information Department of Biological and Agricultural Engineering
P.O. Box 442060
University of Idaho
Moscow, Idaho 83844-2060, USA
Tel. 208-885-7324, fax: 208-885-8923, email: jboll@uidaho.edu

Professional Preparation

- 1995 Ph.D., Cornell University, Dept. of Agricultural and Biological Engr., Ithaca, N.Y.
- 1988 M.S., The Agricultural University of Wageningen, Dept. of Land and Water Use, Wageningen, The Netherlands.
- 1988 M.S., University of Idaho, Dept. of Agricultural Engineering, Moscow, I.D.
- 1985 B.S., The Agricultural University of Wageningen, Dept. of Land and Water Use, Wageningen, The Netherlands.

Appointments

- 2006-present Director of Water of the West, College of Graduate Studies, University of Idaho, Moscow, ID
- 2002-present Associate professor, Dept. of Biological and Agricultural Engineering, University of Idaho, Moscow, ID
- 2004-present Adjunct professor, Environmental Science Program, University of Idaho, Moscow, ID
- 2003(Aug)-2004(Jun), Visiting Professor, Department of Water Resources, Hydrology and Quantitative Water Management Group, Wageningen, The Netherlands.
- 2001-present Affiliate Professor, CATIE (Centro Agronómico Tropical de Investigación y Enseñanza), Turrialba, Costa Rica.
- 1996-2002 Assistant professor, Dept. of Biological and Agricultural Engineering, University of Idaho, Moscow, ID
- 1995 - 1996 Coordinator of Cornell's Hydrology/GIS Group for the New York City Watershed Filtration Avoidance Project. Funded through Watershed Agricultural Council, Walton, NY.
- 1989 - 1995 Research Scientist, Fate of Agricultural Chemicals on Coastal and River Bottom Lands: Monitoring, Modeling and Agronomic Aspects, Water Resources Assessment and Protection Program of the National Research Initiative Competitive Grants Proposal no. 9403179 USDA Grant No. 94-37102-0837; Locating Soil Layers in the Vadose Zone with Non-Destructive Methods. USDA-CSRS Grant No. 91-34214-6024; Using Ground Penetrating Radar to Improve Monitoring and Predicting Preferential Solute Movement in Sandy Soils. USGS Grant No. 14-08-0001-G1921; Preventing Pesticide Contamination of Aquifers by Best Management Practices. USGS Grant No. 14-08-0001-G1907; Water Management, NY State No. 123-8388-379

Selected Publications (last five years)

1. Brooks*, E.S. and **J. Boll**. 2007. Distributed and integrated response of a GIS-based distributed hydrologic model. *Hydrologic Processes* (in press).
2. Hilberts, A.G.J., P.A. Troch, C. Paniconi, and **J. Boll**. 2007. Low-dimensional modeling of hillslope subsurface flow: the relationship between rainfall, recharge, and unsaturated storage dynamics. *Water Resour. Res.* (in press).
3. de Rooij, Gerrit H. Olaf A. Cirpka, Frank Stagnitti, Saskia H. Vuurens, and **Jan Boll**. 2006. Solute transport and dilution in heterogeneous soils: analyzing multicompartment percolation sampler data. *Vadose Zone Journal* 5: 1086-1092.
4. Gorsevski, P.V., P.E. Gessler, **J. Boll**, W.J. Elliot, R.B. Foltz. 2006. Spatially and temporally distributed modeling of landslide susceptibility. *Geomorphology* 80(3-4): 178-198.
5. Brooks*, E.S., **J. Boll**, W.J. Elliot and T. Dechert. 2006. A GPS/GIS-based approach for sediment detachment and delivery modeling on large road networks using WEPP. *Journal of Hydrologic Engineering*. 11(5):418-426.

6. Dai*, X and **J. Boll**. 2006. Deposition of *Cryptosporidium Parvum* and *Giardia Lamblia*. *Water Research*. 40(6):1321-1325
7. Sánchez*, M. and **J. Boll**. 2005. The effect of flow path and mixing layer on phosphorus release: Physical mechanisms and temperature effects. *Journal of Environmental Quality*. 34:1600-1609.
8. Brooks*, E.S., **J. Boll**, and P.A. McDaniel. 2004. An experiment to determine the lateral saturated hydraulic conductivity. *Water Resour. Res* 40, W04208, doi: 10.1029/2003WR002858.
9. Dai*, X., **J. Boll**, M.A. Hayes*, and D.E. Aston. 2004. Adhesion of *Cryptosporidium parvum* and *Giardia lamblia* to Solid Surfaces: the role of surface charge and hydrophobicity. *Colloids and Surfaces, B: Biointerfaces* 34(4):259-263.
10. O'Geen, A.T., P.A. McDaniel, **J. Boll** and E.S. Brooks*. 2003. Hydrologic Processes in Valley Soils of the Eastern Palouse Basin in Northern Idaho, *Soil Sci*. 168(12):846-855.
11. Dai*, X., and **J. Boll**. 2003. Evaluation of Attachment of *Cryptosporidium Parvum* and *Giardia Lamblia* to Soil Particles. *J. Environ. Qual.* 32: 296-304
12. O'Geen, A.T., P.A. McDaniel, **J. Boll**. 2002. Chloride distributions as indicators of vadose zone stratigraphy in semiarid loess deposits. *Vadose Zone Journal* 1:150-157.

Reports:

1. Gravelle, J., Brooks*, E.S and J. Boll. 2005. Comparison of the Cumulative Watershed Effects method and the WEPP:Road model for estimating total sediment load from roads in the Potlatch River basin. Task 2. Technical Report, Submitted to the Idaho Department of Water Quality on 5/21/05. 25 p.
2. Brooks*, E.S. and J. Boll. 2005. Validation of the WEPP model for sediment delivery from non-forested roads. Task 3. Technical Report, Submitted to Idaho Department of Water Quality on 12/1/05. 53 p.
3. Boll, J., E.S. Brooks*, and D. Trauemer. 2002. Sediment Data Collection and Data Management for the South Fork Clearwater River Subbasin Assessment and TMDL. Final report to Idaho Department of Environmental Quality (Agreement No. C109).
4. Boll, J., E.S. Brooks*, and D. Traeumer. 2001. Hydrologic and Sediment Delivery Analysis of Agriculturally Dominated Watersheds in the Clearwater River Basin. Final report to Idaho Soil Conservation Commission.

* Authors with asterisk are former students associated with Dr. Boll's research program

Other Activities

2004–present: Leader of interdisciplinary team of UI faculty and students in USDA-CSREES Conservation Effectiveness Assessment Program. This project was one of four in the nation when awarded. This project's research watershed integrates physical sciences, agricultural economics and rural sociology, and has an outreach component.

2001-06: Steering committee and active participant in the UI IGERT project (team-based research on Tropical Biodiversity and Sustainable Production in Tropical and Temperate Fragmented Landscapes). I also serve as major professor for one IGERT Ph.D. student, whose research takes place in Costa Rica.

2001-2003, Mentor & Participant, National Science Foundation Research Experiences for Undergraduates Intern Program, Environmental Science, University of Idaho

2000-present, National Science Foundation (CAREER): Coordinator of Research and Education Watershed (Paradise Creek Watershed) & Water Agricultural Council and Monitoring Committee for Paradise Creek watershed, Moscow, ID

1996-present: active in the Environmental Science Program since 1996. In 2005, I received the Outstanding Faculty Award in Environmental Science.