

**Idaho Water Resources Research Institute
Annual Technical Report
FY 2013**

Introduction

The Idaho Water Resources Research Institute (IWRRI) is housed at the University of Idaho. IWRRI is dedicated to supporting and promoting water and water-related research, education, and information transfer throughout Idaho. IWRRI collaborates with researchers and educators from all Idaho state universities; staff of local, state, and federal agencies; and private water interests. The IWRRI is the only mechanism in the state that provides an autonomous statewide source of support for water research and training without regard to specific topic or discipline area. This is important because Idaho's water problems cross multiple topics and disciplines and compartmental approaches to these problems are less effective. IWRRI is relied upon by state and federal agencies and private water interests to provide the objective expertise to address the needs of the state and region. The Institute has been a strong proponent of education and outreach for both youth and adult audiences. It is through education that the public can make informed public policy decisions concerning water. It is also through education that individual citizens become engaged in the process through adjustments of their own attitudes and lifestyles.

Research Program Introduction

The Idaho Water Resources Research Institutes research program is comprised of the following objectives: (1) To work with state and federal agencies and non-government organizations to identify water research needs of the state and region; (2) To promote water-related research relevant to state and regional needs; (3) To stimulate, coordinate, and provide leadership for water resources research within Idaho universities and collaborate with sister institutions in adjoining states; (4) To cooperate with and assist state and federal agencies and non-governmental organizations for the benefit of the citizens of Idaho and the region; and (5) To develop funding for needed research and encourage cooperation with other research organizations.

Due to a significant reduction in the funding provided to support the USGS 104B program, no new research projects could be during the 2013 104B Program Fiscal Year. However, there were several projects that were extended from the 2012 project year, and these projects spanned a variety of water resource issues that are important to maintaining Idaho's most precious resource, which included: understanding the ecosystem services in our river basins; developing a conjunctive planning model for Idaho's most important water resource; developing a better understanding of water quality conditions in the Treasure Valley; and investigating the inter-relationship between salmon spawning and geomorphic changes in Idaho's high mountain streams.

Developing a Conjunctive Water Resources Planning and Management Model for the Eastern Snake River Plain

Basic Information

Title:	Developing a Conjunctive Water Resources Planning and Management Model for the Eastern Snake River Plain
Project Number:	2012ID178B
Start Date:	3/1/2012
End Date:	2/28/2014
Funding Source:	104B
Congressional District:	ID 2
Research Category:	Engineering
Focus Category:	Management and Planning, Drought, None
Descriptors:	
Principal Investigators:	Jae Ryu

Publications

1. Acharya A., Ryu, J. H. 2013. Streamflow disaggregation using a relatively simple method for regulated and unregulated waterways , Journal of Hydrological Engineering (in press)
2. Sohrabi, M., Ryu, J H., Abatzoglou, J., Tracy, J. 2013. Climate extreme and its linkage to regional drought over Idaho, USA , Natural Hazards, 65:653-681
3. Ryu, J H., Contor, B., Johnson, G., Allen, R., Tracy, J. 2012. System Dynamics to Sustainable Water Resources Management in the Eastern Snake Plain Aquifer under Water Supply Uncertainty , Journal of the American Water Resources Association, 48(6), 1204-1220
4. Smith, M.B., Koren, V., Zhang, Z., Zhang, Y., Reed, S.M., Cui, Z., Moreda, F., Cosgrove, B.A., Mizukami, N., Anderson, E.A., DMIP 2 Participants (Ryu, J.H.), 2012. Results of the DMIP 2 Oklahoma experiments , Journal of Hydrology, 418-419, 17-48
5. Jungjin Kim Drought Visualization using Big Data Inputs to Mitigate Climate-Driven Future Drought , Expected start of field work June 2013
6. Mohammad Sohrabi Development of Soil-Moisture Drought Index to Characterize Hydrological Drought in the Mountain West , Expected graduation summer 2016
7. David Hoekema Economic-based System Dynamics for Conjunctive Water Management in the Eastern Snake Plain Aquifer , Expected graduation summer 2016

Developing a Conjunctive Water Resources Planning and Management Model for the Eastern Snake River Plain

Project Summary

The management and control of water supply in the Snake River Basin is critical to the economic development of the arid portions of southern Idaho. The expansion of groundwater irrigation on the Eastern Snake River Plain (ESRP) and the improved efficiencies in surface water irrigation application continue to threaten reliable water resources in groundwater discharge from the Eastern Snake Plain Aquifer (ESPA) into the Snake River Canyon. Many federal, state, and local agencies have put efforts to better manage the ESPA through a Comprehensive Aquifer Management Plan (CAMP) processes. Although the Snake River Planning Model (SRPM) developed and applied by Idaho Department of Water Resources (IDWR) to better manage water resources in ESPA, the reservoir operation model is not fully incorporated in the model. As such, the goal of this research is to develop a new modeling framework using Riverware software to characterize water flux dynamics between surface and groundwater interactions.

This project has three major benefits: (1) it tests the ability of Riverware to be used to model conjunctive management as it relates to the Snake River system without the time and expense of developing a completely new reservoir operations model, (2) uncertainties in estimates of tributary underflow, natural recharge, crop selection, and irrigation methods is quantified, while (3) initiating a project that could potentially lead to the development of a new state of the art planning and management model to complement IDWR's

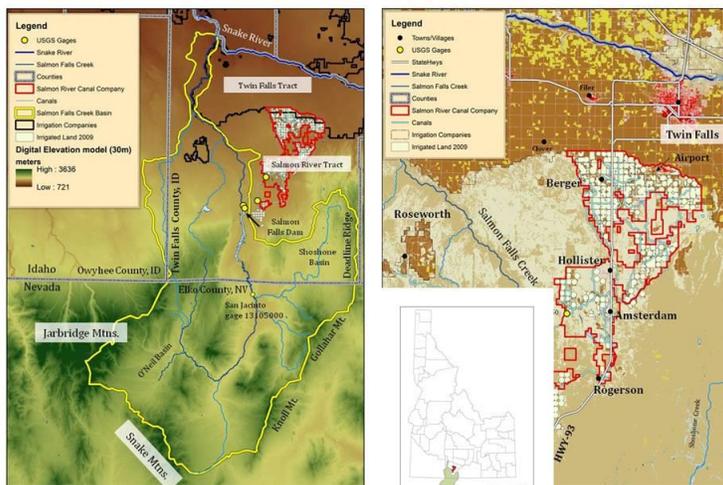


Figure 1. The Salmon Falls Creek Basin (shown in green) and Salmon Tract (shown in red outline) located in southern Idaho and northern Nevada

groundwater model, the Eastern Snake Plain Aquifer Model (ESPAM). While the first benefit focuses on providing practical support to IDWR, from a scientific perspective, the second benefit is the most intriguing.

A series of research tasks has been completed over last several months. The first step in carrying out the project was to create a modeling framework in Riverware to represent the groundwater/surface water and natural recharge components of the water budget within the Salmon Tract, which is part of ESPA region (See Figure 1). Initial inputs were assembled from the ESPAM model into a spreadsheet format linked with the model developed in Riverware.

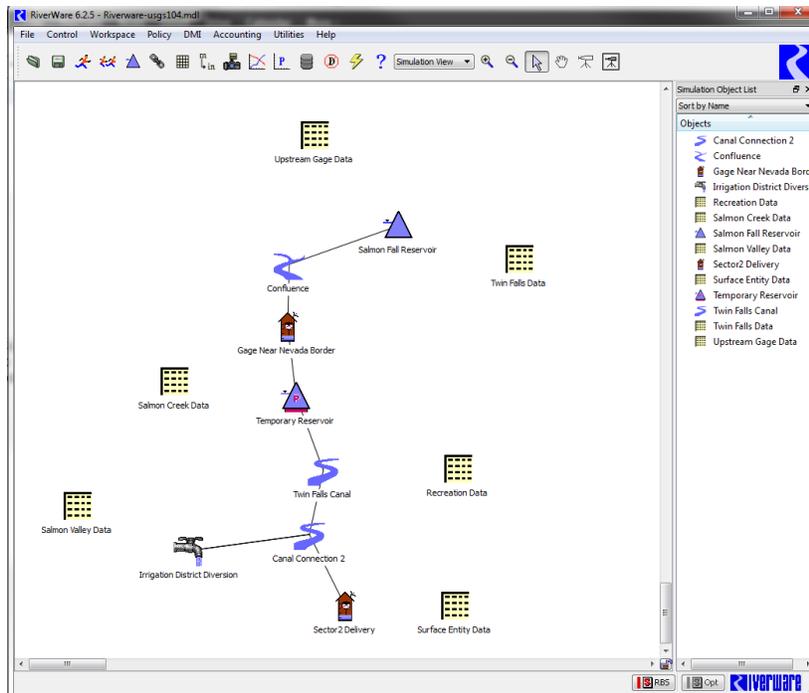


Figure 2. Riverware model for the Salmon Tract

The best records possible were used for this study by extending ESPAM records back to 1928. During the calibration process other data sources and recharge assumptions were applied within the response function framework to improve our understanding of how uncertainties in assumptions, inputs, and data sources affect our understanding the ESRP aquifer.

The result indicates that a reasonably accurate groundwater/surface modeling setting from this research contributes to a future reservoir (surface-water) management model that would

be directly compatible with ESPAM in Riverware settings (See Figure 2).

1. Outputs:

Publication (*, # indicates a graduate student and postdoc co-author, respectively)

#Acharya A., Ryu, J. H. 2013. "Streamflow disaggregation using a relatively simple method for regulated and unregulated waterways", *Journal of Hydrological Engineering*, 19(3), 509-519

*Sohrabi, M., Ryu, J.H., Abatzoglou, J., Tracy, J. 2013. "Climate extreme and its linkage to regional drought over Idaho, USA", *Natural Hazards*, 65:653-681

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Presentations (*, # indicates a graduate student and postdoc co-author, respectively)

Ryu, J.H., 2013, "Toward Visualizing Big Drought Data for Data-Intensive Decision Making", ASCE World Environmental and Water Resources Congress, May 19-23, Cincinnati, Ohio

Ryu, J.H., 2013, "Decision Support Tools for Conflict resolution and Sustainable Water Resources Planning and Management: After Pete's approach", ASCE World Environmental and Water Resources Congress, May 19-23, Cincinnati, Ohio

*Kim, Jungjin, M, Ryu, J.H., 2013, "Mapping Drought Vulnerability Driven by Future Climate Change and Variability in South Korea", ASCE World Environmental and Water Resources Congress, May 19-23, Cincinnati, Ohio

*Sohrabi, M, Ryu, J.H., 2013, "Development of Multi Scalar-Soil Moisture Drought Index", ASCE World Environmental and Water Resources Congress, May 19-23, Cincinnati, Ohio

*Kim, J.J., Hoekema, D., Ryu, J.H., 2013, "Validating Local Droughts to Enhance Climate-Resilient Agricultural Water Management in Idaho", 2013 NSF EPSCoR Tri-State Meeting, University of Nevada at Las Vegas, March 27-28, Las Vegas, Nevada

Ryu, J.H., 2012, "Decision Support Tools for Drought Monitoring Management and Forecasting in the State of Idaho", 2012 Annual Water Resources Conference, American Water Resources Association, Hyatt Regency Jacksonville Riverfront, November 12-15, Jacksonville, Florida

Ryu, J.H., 2012, "Toward Mapping Gridded Drought Indices to Mitigate Drought Impacts in a Rapid Changing Global Environment", 3rd Annual Pacific Northwest Climate Science Conference, October 1-2, Boise Centre, Boise, Idaho

Ryu, J.H., 2012, "Development of Sustainable Water Resources System Against Uncertain Future Climate and Drought for the Seomjin River System, Korea", 18th Congress of the Asia and Pacific Division of the International Association for Hydro-Environment engineering and Research , August 19-23, Jeju Island, Korea

*Hoekema, D., Ryu, J.H., 2012, "Using Satellite Imagery to Estimate Aquifer Recharge from Irrigated Agriculture", ESRI International User Conference, July 23-27, San Diego, California

Ryu, J.H., 2012, "A Decision Support Systems to Mitigate Water Conflicts amongst Agriculture, Hydro, and Municipal Water Users", Universities Council on Water Resources, July 17-19, Santa Fe, New Mexico

*Sohrabi, M., Ryu, J., 2012, "Spatial and Temporal Analysis of Climatic Extremes in the Mountainous Regions of Iran", International Conference on Climate Change: Impacts and Responses, University of Washington, July 12-13, Seattle, Washington

*Hoekema, D., Ryu, J.H., 2012, "Calculator: Optimized Surface Water Allocation in Drought (OSWAD)", 93rd Annual Meeting of the AAAS Pacific Division, Boise Convention Center, June 24-27, Boise, Idaho

#Acharya, A., Ryu, J.H., 2012, "Impacts of Climate Change on Hydrologic Drought in an Agriculture-dominated Watershed in the United States", ASCE World Environmental and Water Resources Congress, May 20-24, Albuquerque, New Mexico

*Hoekema, D., Ryu, J.H., 2012, “Investigating Economic Impacts of Agricultural Drought Using System Dynamics”, ASCE World Environmental and Water Resources Congress, May 20-24, Albuquerque, New Mexico

Ryu, J.H., 2012, “Drought Monitoring, Forecasting, and Management in the 21st Century: Issues and Challenges”, ASCE World Environmental and Water Resources Congress, May 20-24, Albuquerque, New Mexico

Working Papers (*, # indicates a graduate student and postdoc co-author, respectively)

*Sohrabi, M., Ryu, J.H., Abatzoglou, J., Tracy, J. 2013. “Development of Multi Scalar-Soil Moisture Drought Index”, Journal of Hydrological Engineering

Thesis Research (Ph.D. Students)

David Hoekema “Economic-based System Dynamics for Conjunctive Water Management in the Eastern Snake Plain Aquifer”, Expected graduation summer 2016

Jungjin Kim “Drought Visualization using Big Data Inputs to Mitigate Climate-Driven Future Drought”, Expected start of field work June 2013

Mohammad Sohrabi “Development of Soil-Moisture Drought Index to Characterize Hydrological Drought in the Mountain West”, Expected graduation summer 2016

An Ecosystem Services Analysis of the Boise River Basin

Basic Information

Title:	An Ecosystem Services Analysis of the Boise River Basin
Project Number:	2012ID179B
Start Date:	3/1/2012
End Date:	9/30/2013
Funding Source:	104B
Congressional District:	ID 1
Research Category:	Social Sciences
Focus Category:	Economics, Ecology, Water Use
Descriptors:	
Principal Investigators:	Scott Lowe

Publication

1. Archived report (Idaho Rivers United): “Boise River Basin Ecosystem Services Assessment Project: Preliminary Analysis”. Submitted -- August 2012

An Ecosystem Services Analysis of the Boise River Basin

Project Summary

The goal of the project was to hire undergraduate students to identify and (if possible) measure the ecosystem services provided by the Boise River Basin (BRB). This effort would include an initial review of literature (and data, if available), and an analysis of the ecosystem services associated with the BRB. Four areas of emphasis were identified: First, a large-scale identification of all *potential* ecosystem services in the BRB; second, a collection of economic analyses of the ecosystem services in the BRB; third, a review of external studies that have presented valuations for the (similar) ecosystem services identified in area of emphasis one, above; fourth, a review of existing local and regional data that can be used to address the deficiencies in measures of ecosystem services in the BRB.

The large-scale identification of the potential ecosystem services associated with the BRB included 33 major categories, which were further consolidated into three refined categories: Provisioning Services, Cultural Services, and Regulating and Supporting Services. Although there is some overlap between categories, each of these three encompasses all of the services potentially provided by an ecosystem. To ensure the ecosystem services list reflects local concerns and priorities, a group of Boise State University and University of Idaho faculty, undergraduate students, and representatives from the local non-profit community, in conjunction with the USGS and the IWRRI, held a stakeholder meeting on March 7th, 2012 to identify the ecosystem services associated with the BRB, and to begin to identify data that might be available to qualify or quantify some of these ecosystem services. The stakeholders in attendance included:

1. Idaho Rivers United
2. Trout Unlimited
3. Audubon
4. Land Trust Treasure Valley
5. Idaho Gold Prospectors Association
6. Community Planning Association of Southwest Idaho
7. Idaho Angler
8. Federation of Fly Fishers
9. Idaho City Chamber of Commerce
10. Ada County Association of Realtors
11. Idaho Fish and Game - SW Region
12. Idaho Dept of Water Resources
13. State Floodplain Manager
14. Idaho Parks and Recreation
15. Bureau of Reclamation
16. Snake River Area Office
17. City Representatives (Caldwell, Eagle, Boise)
18. Ada County Parks and Waterways
19. Idaho Power
20. United Water Idaho
21. Idaho Water District 63
22. Boise Project Board of Control
23. Ada Soil and Water Conservation District
24. Tribal nations
25. Golden Eagle Audubon Society
26. US Fish & Wildlife Service
27. Boise Smart Growth
28. Idaho Conservation League
29. Nature Conservancy
30. Bureau of Land Management
31. Army Corps of Engineers
32. Idaho Department of Environmental Quality
33. Idaho Department of Lands
34. Local Businesses (Amalgamated Sugar Company)

The stakeholders attended a 4 hour meeting in which they were presented with a brief discussion of what ecosystem services are, given the delineation of the Boise River Basin, and then were asked to brainstorm within groups about the ecosystem services that they could identify within the Boise River Basin.

We were able to hire three undergraduate students to help with the project. Together, they facilitated the stakeholder meeting, collected information from the stakeholder meeting, conducted a literature review, collected data on the BRB and developed a report for Idaho Rivers United.

One of the undergraduate students (Brice Froshhauser) that was employed through the grant focused on the qualification and quantification of three ecosystem services associated with the BRB: local agriculture, recreation, and health. This research resulted in a supplementary report for Idaho Rivers United that was the basis for part of the content in the “Where’s the River” campaign. In addition, the research conducted by the undergraduate students has resulted in data and literature that was used to develop a successful (\$200k) USGS Climate Science Center proposal (“Changes to watershed vulnerability under future climates, fire regimes and population pressures” – Jason Kreitler PI) which will be completed over the 2014-2016 timeframe. A graduate student at BSU will be partially funded through this USGS grant (\$30k).

Publications Resulting from the Project

Archived report (Idaho Rivers United): “Boise River Basin Ecosystem Services Assessment Project”.

Undergraduate Student Researchers supported on the project

Brice Froshhauser – BA Economics/German; current status: senior (will graduate spring 2014)

Richae Swanbeck – BBA Economics; graduated summer 2012

Jesse Rosenthal – BBA Economics; graduated spring 2013

Notable Achievements or Awards

One successful grant application:

Project title: Changes to watershed vulnerability under future climates, fire regimes, and population pressures

Principal Investigator: Jason Kreitler Ph.D., Research Geographer, Western Geographic Science Center

Co-PIs: Joel Sankey – USGS, Todd Hawbaker – USGS, Nicole Vaillant – US Forest Service, Scott Lowe – Boise State University

Short description: We will assess the interacting threats of climate change and increased wildfire on the ecosystem service of water supply to communities to determine how the spatial variability of watershed vulnerability may change across the West.



Webcam screen grab from the Boise River Basin Ecosystem Services Roundtable

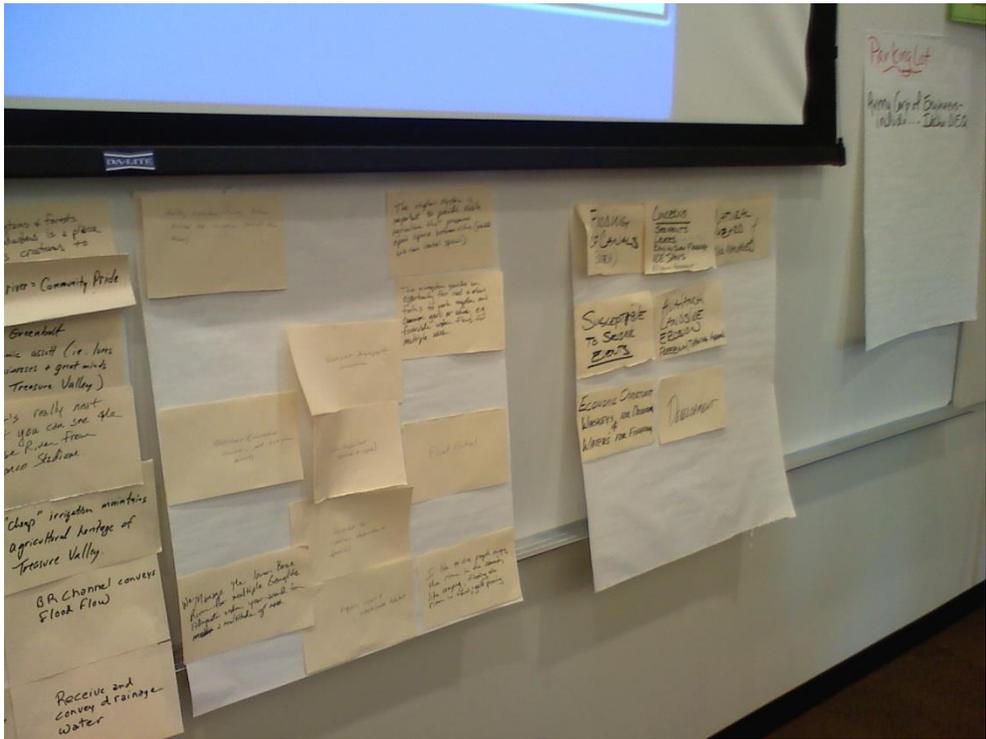


Photo of the ecosystem services brainstorming session

Characterizing Boise River Watershed Water Quality Using BASINS Modeling

Basic Information

Title:	Characterizing Boise River Watershed Water Quality Using BASINS Modeling
Project Number:	2012ID182B
Start Date:	3/1/2012
End Date:	2/28/2014
Funding Source:	104B
Congressional District:	ID 1
Research Category:	Water Quality
Focus Category:	Non Point Pollution, Water Quality, Models
Descriptors:	
Principal Investigators:	Shawn Benner

Publications

There are no publications.

Temporal and Spatial Nutrient Evolution of the Lower Boise River, SW Idaho

Project Summary

The Lower Boise River in southwest Idaho becomes increasingly contaminated with nutrients as it passes through the urban and agriculturally active Treasure Valley before joining the Snake River and the river is under TMDL designation for phosphorus loading to the Snake River. The observed increases are typically attributed to a combination of non-point source contamination from agricultural land use and point source from waste water treatment facilities. Understanding the river chemistry and how it evolves spatially and temporally will help locate the areas that input the highest level of contamination as well as areas that contain the highest concentrations and loading. This project is focusing on the seasonal hydrology and geochemical trends through an extensive field sampling campaign to better understand the sources and complexity of nutrient contamination.

To determine river chemistry, six separate synoptic sampling events were conducted seasonally along the approximately 64 miles from Diversion Dam to the Snake River. These sampling events were conducted in July 2012 during high irrigation, October 2012 during the end of irrigation, December 2012 during non-irrigation and historically the highest concentrations, April 2013 at the start of irrigation, June 2013, and October 2013. Samples were collected every quarter to half mile with a higher frequency of samples taken between Star Idaho and Caldwell Idaho due to an increased number of inputs from tributaries and drainages. The samples were then analyzed at Boise State University for the anions bromine, chloride, fluoride, nitrate, nitrite, phosphate, and sulfate, using an E.P.A. 300.0 equivalent method.

Data from laboratory analysis shows overall trends of increasing concentrations for most of the analyzed anions. Bromine, fluoride, and nitrite were at or below detection. Sulfate and chloride show similar trends between each sampling event with spikes in concentrations occurring at the same intervals. Orthophosphate and nitrate increase over the study reach with major increases observed at waste water treatment plant outlets; the greatest spikes occur at the West Boise facility and the Caldwell facility. The largest, previously unknown, non-point source spike was located approximately 27 miles east of Diversion Dam where concentrations increased in the fall and winter. The high density sampling provides the best evaluation to date of the relative importance of non-point source nutrient loading to the Boise River. The data shows no significant nutrient loading from stream tributaries not associated with sewage treatment plants and exhibits to no sections where gradual increases are observed, suggesting that nutrient loading to the Boise River from agricultural sources are an important source of loading.

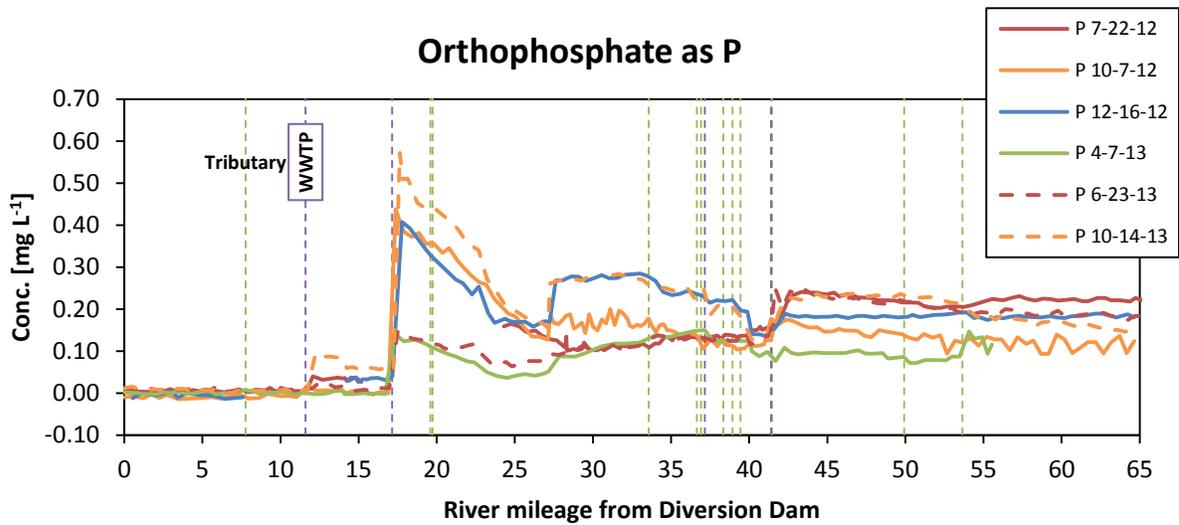


Figure 2: LBR Orthophosphorus data from six sampling events between July 2012 and October 2013. Samples were taken from Diversion Dam (0 mi) to the Snake River (65 mi).

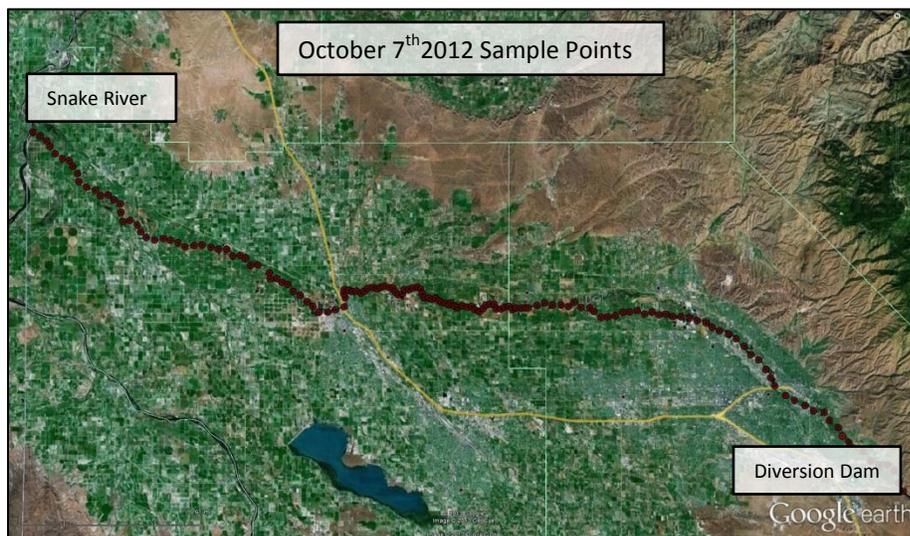


Figure 1: Frequency of sampling points from October 7th sampling. 154 samples were collected over 65 miles.

Publications Resulting from this Project

None, 2 thesis in progress, see below.

Graduate Student Researchers supported on the project

M.S. Graduate Student: Brian Yelen: *Temporal and Spatial Nutrient Evolution of the Lower Boise River, SW Idaho*

M.S. Graduate Student: Ian Penn: *Algal growth increasing nutrient loading on the Boise River*

Notable Achievements or Awards:

This project provides the most definitive dataset documenting the limited contribution of nutrients to the Boise River from agricultural sources. With impending reductions in phosphorus discharge from sewage treatment plants, this work will provide a baseline to evaluate the impact of that change.

The geomorphic signature of salmon: quantifying the impact of spawner density on stream bed morphology and habitat for future spawners to inform water resources management

Basic Information

Title:	The geomorphic signature of salmon: quantifying the impact of spawner density on stream bed morphology and habitat for future spawners to inform water resources management
Project Number:	2012ID183B
Start Date:	3/1/2012
End Date:	2/28/2014
Funding Source:	104B
Congressional District:	ID 1
Research Category:	Climate and Hydrologic Processes
Focus Category:	Hydrology, Ecology, Geomorphological Processes
Descriptors:	
Principal Investigators:	Elowyn Yager, Elowyn Yager

Publication

1. Buxton, T.*, E.M. Yager, J.M. Buffington, M.A. Hassan, A.K. Fremier (being revised for resubmission to Journal of Geophysical Research), Grain packing resistance to particle mobility.

Project Summary -

The geomorphic signature of salmon: Population density-dependent feedbacks are a foundational driver of ecological dynamics. However, the scientific community lacks a mechanistic understanding of density-dependent feedbacks where biology interacts with geophysical systems, largely because of the difficulty of extrapolating from laboratory studies to the field. Together with Drs. Elowyn Yager (UI) and John Buffington (RMRS), we have simulated salmon nest (termed redds) construction under experimental conditions (a hydraulic flume) to investigate how salmon density impacts stream morphology.

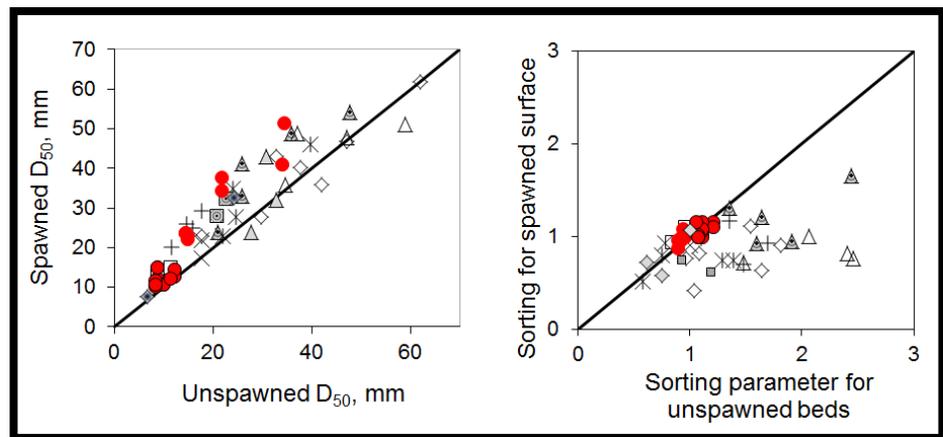


SIMULATED REDDS IN A FLUME

Over the funding period we successfully simulated redd structures in the flume to better understand how salmon alter sediment mobility in streams. We first compared simulated redds to field redds. The graph below shows how our simulated redds are quantitatively similar to field measured redds (redd symbols are flume redds).

Our primary study aim was to describe the fundamental equations of sediment transport across varying densities of spawning salmon so we have finished drafts of manuscripts to quantify how salmon alter bed 'packing', sediment mobility and the exchange of marine derived nutrients in streams. One paper was submitted for publication and we are currently revising it after receiving reviews. We also found that salmon spawning can decrease channel bed stability by altering the arrangement of sediment on the bed and this can lead to increases in sediment fluxes in channels. Finally, we used a numerical model to show that spawning can alter the exchange of water and nutrients between the surface and subsurface water, and such exchange could help the survival of salmon and other aquatic organisms. We have investigated the complex feedbacks between organisms and their environment and has significant applied implications for restoring salmon worldwide.

Our work was funded by a USGS 104b and a USDA McIntire-Stennis grant. The USGS 104b grant supported one full year of Todd Buxton's dissertation work. He is a recent PhD graduate at UI. The grant also supported one field technician. Cindy Adams was a MS student at UI at the time.



Publications Resulting from the Project

No publications yet but some presentations and one manuscript that is being revised after submission (see below). One web-page ScienceNews write up (see below).

Undergraduate and Graduate Student Researchers supported on the project

Our work was funded by a USGS 104b and a USDA McIntire-Stennis grant. The USGS 104b grant supported one full year of Todd Buxton's dissertation work (Water Resources). He was a PhD student at UI. The grant also supported one field technician. Cindy Adams was a MS student at UI at the time (Environmental Science).

Notable Achievements or Awards

Two manuscripts in preparation and one that is being revised. One PhD dissertation completed.

Buxton, T.*, E.M. Yager, J.M. Buffington, M.A. Hassan, A.K. Fremier (being revised for resubmission to Journal of Geophysical Research), Grain packing resistance to particle mobility.

Buxton, T.*, J.M. Buffington, E.M. Yager, A.K. Fremier, M.A. Hassan. 2012. The influence of salmonid spawning on grain architecture, critical bed shear stress, and bed load transport in streams. American Geophysical Union, San Francisco, CA (presentation)

Buxton, T. J.M. Buffington, E.M. Yager, A.K. Fremier. 2013. The influence of salmon spawning on grain architecture, critical bed shear stress, and bed load transport in streams with implications for fisheries restoration and management. Western Division American Fisheries Society, Boise, ID. (presentation)

T. Buxton written up in InsideScience.org science blog (December 6, 2012) after AGU presentation. <http://www.insidescience.org/content/salmon-agents-riverbed-erosion/866>

The geomorphic signature of salmon: quantifying the impact of spawner density on stream bed morphology and habitat for future spawners to inform water resources management

Basic Information

Title:	The geomorphic signature of salmon: quantifying the impact of spawner density on stream bed morphology and habitat for future spawners to inform water resources management
Project Number:	2013ID200B
Start Date:	3/1/2013
End Date:	2/28/2014
Funding Source:	104B
Congressional District:	ID-1
Research Category:	Climate and Hydrologic Processes
Focus Category:	Hydrology, Ecology, Geomorphological Processes
Descriptors:	
Principal Investigators:	Elowyn Yager

Publication

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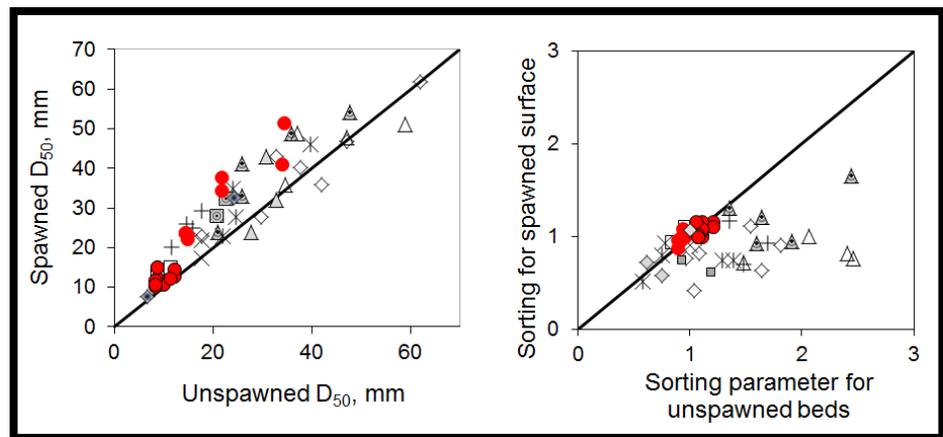


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Buxton, T. J.M. Buffington, E.M. Yager, A.K. Fremier. 2013. The influence of salmon spawning on grain architecture, critical bed shear stress, and bed load transport in streams with implications for fisheries restoration and management. Western Division American Fisheries Society, Boise, ID. (presentation)

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Information Transfer Program Introduction

The Idaho Water Resources Research Institutes Outreach and Information Transfer program is comprised of the following objectives: (1) To encourage and facilitate public involvement in water resource programs within the state; and (2) To promote water education within the state at the K–12, undergraduate and graduate levels. During the 2013 Program Year, 104B program and state funds were used to support the Idaho Water Resources Outreach and Engagement Effort.

The Idaho Water Resources Outreach and Engagement Project

Basic Information

Title:	The Idaho Water Resources Outreach and Engagement Project
Project Number:	2012ID181B
Start Date:	3/1/2012
End Date:	2/28/2014
Funding Source:	104B
Congressional District:	ID 1 and 2
Research Category:	Not Applicable
Focus Category:	None, None, None
Descriptors:	
Principal Investigators:	John C. Tracy, Julie Scanlin

Publications

There are no publications.

Idaho Water Resources Outreach and Engagement Project Summary

A summary of this project's outputs and outcomes is given below based on the activities described in the project proposal.

Bringing Water Resources Education to the K-12 Classroom

Approximately 225 teachers were trained during 12 accredited Water Education Workshops that were delivered at locations across Idaho. In addition, IWRRI participated as an i-STEM provider at the Idaho i-STEM summer institutes in Twin Falls and Boise and continued coordinated efforts with the Boise WaterShed, Idaho Water Education Foundation and the Idaho Department of Environmental Quality on various K-12 education and outreach efforts. IWRRI also trained 12 Project WET Facilitators, initiated training and development for Climate Science coursework and made presentations to teachers at the annual Idaho Science Teachers Conference, the Idaho Environmental Education Conference and Teacher's Night Out, with an estimated 250 teacher contact.

Providing Water Resources Experiential Learning to K-12 Students

IWRRI participated in youth outreach efforts across the state, including the Water Awareness week (over 7,000 attendees) events and provided materials and support for the Youth Water Festival in Moscow, Idaho.

The Idaho Water Resources Research Seminar Series

Beyond supporting K-12 education, IWRRI provided a state wide water resources seminar series during the Fall semester of 2012, delivered via a compressed video system to Boise, Moscow, Pocatello, Idaho Falls and Coeur d'Alene (13 seminars during the year with an average attendance in all locations of 25 people per seminar). During project year 2012, IWRRI expanded its reach across the state of Idaho, through increasing its seminar and professional outreach activities in Northern Idaho through collaborations with the University of Idaho Coeur d'Alene Center.

The Idaho Travel Grant Program

During Project Year 2012, travel support was provided to the Director of the Idaho Water Resources Research Institute, faculty and researchers at the University of Idaho. Support was provided for travel to attend: the 2012 Annual UCOWR Conference in Santa Fe, New Mexico, July 17 – 20, 2012 (Director and one faculty member); the 3rd Annual Pacific Northwest Climate Conference in Boise, Idaho, October 1 and 2, 2012 (multiple faculty members and graduate students); the Columbia River Treaty Symposium, October 10-12, 2012, in Polson, Montana (Director and Graduate Student); and the 2012 Annual AWRA Conference, November 12-15, 2012, in Jacksonville, Florida (Director and one faculty member).

Support for the 3rd Annual Pacific Northwest Climate Science Conference

The Third Annual Pacific Northwest Climate Science Conference was held at the Boise Centre Conference facility in Boise, Idaho on October 1 and 2, 2012. A complete agenda of the conference is provided in the Appendix to this report, along with links to each presentation made at the conference, including papers that were presented during the poster session. Overall there were over 50 oral presentations provided at the conference.

The morning for each day of the conference consisted of Plenary Sessions. Day 1 included a welcome to the conference by the Mayor of Boise, and leaders at the University of Idaho, a key note talk by Dr. Roger Pulwarty of the National Integrated Drought Information System, followed by a session addressing climate change impacts and adaptations within the Columbia Basin. The Plenary session for Day 2 included talks addressing the latest advances in understanding Climate Variability, Assessment of Vulnerabilities to Climate Change within the Pacific Northwest, and Communicating Climate Change to a wider audience.

The afternoon sessions for each day of the conference consisted of Concurrent Technical Sessions. The afternoon of October 1st included sessions on Climate Change impacts to: the region's hydrologic systems; conservation efforts; and agricultural systems. On October 2nd, the first afternoon track addressed climate change impacts to terrestrial and aquatic systems, with the second track focusing on adaptation strategies to address climate change and how human health is being impacted by climate change.

The poster session was held on the evening of October 1st, and was well attended, with over 50 posters being presented on a range of topics including climate change impacts to: hydrology; conservation, human health, agriculture. In addition, there were several papers addressing the role of Landscape Conservation Cooperatives in addressing climate change, communication of climate change to the public and methods for assessing the vulnerability of systems to climate change.

One of the primary goals of the conference was to provide a forum where resource managers in the Pacific Northwest region could communicate their challenges related to climate change with the scientific community researching the impacts of climate change. Thus, the conference was structured to stimulate both a place and resource based exchange of information and ideas related to climate, climate impacts and adaptation. To achieve this goal, there was a balance between presentations offered by the academic community (approximately 41% of the presentations) and governmental organizations (approximately 45% of the presentations), with the remaining 4% of the presentations provided by non-governmental entities.

The conference also focused on a combination of cross-cutting topics of relevance to multiple disciplines, as well as on clear practical applications of climate change science. Of the oral presentations, approximately 49% focused on case studies or applications of known science to resource management issues, 41% focused on advances in understanding of climate change impacts across the region, and 10% addressed approaches to better educate and engage the broader public in discussions related to climate change and its impacts on human and natural systems in the Pacific Northwest.

Overall the meeting was well attended, with 196 registered attendees, with approximately 25% of the attendees being undergraduate or graduate students from Universities within the region, 10% being from non-governmental entities and the remaining attendees being fairly equally split between academic and governmental organizations (both federal and state) located within the Pacific Northwest. The general feedback from the conference attendees was positive, in regard to the content of the information provided, the venue and the format of the meeting.

Additional Activities

In addition, during the 2012 Program Year, training opportunities for water professionals were continued through interactions with the Boise Watershed Center. The Institute has continued its support of the annual Idaho Environmental Education Conference. IWRRI also has the capacity to provide

statewide distribution of professional short courses and professional development workshop as available to statewide water professionals. IWRRI continues to network and coordinated to work on a regional level with other institutes and water research entities. Finally, the IWRRI continues its support of the Idaho State Chapter of the American Water Resources Association by recruiting members and providing sponsorship and publicity for several of its events.

During the current project year, IWRRI also developed the Western States Workshop on Remote Sensing of ET Applications in the Western United States, held on October in Boise, ID, October 24 – 26, 2012; sponsored the Palouse Water Summit, held in Moscow, ID in October of 2012; and the Idaho Water Users Conference, held in Boise, ID in January 2013.

The Idaho Water Resources Outreach and Engagement Project

Basic Information

Title:	The Idaho Water Resources Outreach and Engagement Project
Project Number:	2013ID193B
Start Date:	3/1/2013
End Date:	2/28/2014
Funding Source:	104B
Congressional District:	ID-ALL
Research Category:	Not Applicable
Focus Category:	Education, Hydrology, Water Supply
Descriptors:	
Principal Investigators:	John C. Tracy, Julie Scanlin

Publications

There are no publications.

Idaho Water Resources Outreach and Engagement Project Summary

Project Summary

Bringing Water Resources Education to the K-12 Classroom

Approximately 250 teachers were trained during 12 accredited Water Education Workshops that were delivered at locations across Idaho. In addition, IWRRRI participated as an i-STEM provider at the Idaho i-STEM summer institutes in Twin Falls and Boise and continued coordinated efforts with the Boise WaterShed, Idaho Water Education Foundation and the Idaho Department of Environmental Quality on various K-12 education and outreach efforts. IWRRRI also trained 12 Project WET Facilitators, participated in the training and development for Climate Science coursework and made presentations to teachers at the annual Idaho Science Teachers Conference, the Idaho Environmental Education Conference and Teacher's Night Out, with an estimated 250 teacher contacts.

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The Idaho Water Resources Research Seminar Series

Beyond supporting K-12 education, IWRRRI provided a state wide water resources seminar series during the Fall semester of 2013, delivered via a compressed video system to Boise, Moscow, Pocatello, Idaho Falls and Coeur d'Alene (11 seminars during the year with an average attendance in all locations of 25 people per seminar). During project year 2013, IWRRRI expanded its reach across the state of Idaho, through increasing its seminar and professional outreach activities in Northern Idaho through collaborations with the University of Idaho, Coeur d'Alene Center with the opening of the Northern Idaho Community Water Resources Center on the University of Idaho campus in Coeur d'Alene, ID.

The Idaho Travel Grant Program

During Project Year 2013, travel support was provided to the Director of the Idaho Water Resources Research Institute, faculty and researchers at the University of Idaho. Support was provided for travel to attend: the 2013 AWRA Spring Specialty Conference on Water Resources and Agriculture in St. Louis, MO on March 25 – 27, 2013 (Director); the Spokane River Forum in Spokane, WA on March 27 and 28, 2013 (Director, one faculty and one Post-Doc), the 2013 Annual UCOWR Conference in South Lake Tahoe, CA, July 10 – 13, 2013 (Director and one faculty member); the 2013 Annual AWRA Conference, November 4 to 7, 2013, in Portland, OR (Director and one faculty member and one graduate student); and the 2nd Annual Idaho Flood Plain Managers Conference in Boise, ID on November 14 and 15, 2013 (Director and one faculty member);.

Support for the 2nd Annual Idaho Flood Plain Managers Conference

The Second Annual Idaho Flood Plain Managers Conference was held at the URS Headquarters Complex in Boise, ID on November 13, 14 and 15, 2013. A complete agenda of the conference is provided in the Appendix to this report.

The first day of the conference consisted of Certified Floodplain Manager refresher courses, along with a half-day field trip to Arrowrock Dam, which is one of the earliest tall concrete dams constructed by the US Bureau of Reclamation. The second day of the conference consisted of a series of concurrent sessions covering a wide range of Floodplain Management topics in the morning, with plenary sessions in the afternoon covering the topics of: Biggert-Waters Flood Insurance Reform; the Relationship between Flood Control and Irrigation Operations; Climate Change and Water Resources in Idaho; and Building Disaster Resilient Communities. The final day of the conference continued with additional plenary sessions in the morning, with the afternoon providing an opportunity to take the Certified Floodplain Managers exam.

One of the primary goals of the conference was to provide a forum where the Flood Plain Management Community in Idaho could interact with each other and learn how Idaho's communities are addressing flood risks and the management of flood prone areas. This goal was met, with conference attendance representing a mix of communities across Idaho, from as far north as Sandpoint, ID, to the eastern communities of Driggs, Idaho Falls and Pocatello, and the southwestern communities of Caldwell, Meridian and Boise. Overall the meeting was well attended, with over 100 registered attendees, with a good mix of attendees from local governments, state and federal agencies, and the consulting industry. In addition, there were two attendees from the insurance industry, which is an important constituency that has not been represented in previous meetings of this type. The general feedback from the conference attendees was positive, in regard to the content of the information provided, the venue and the format of the meeting. Overall the conference was rate highly by the attendees, with a complete summary of a survey completed by conference attendees attached to this report.

Additional Activities

In addition, during the 2013 Program Year, training opportunities for water professionals were continued through interactions with the Boise Watershed Center. The Institute has continued its support of the annual Idaho Environmental Education Conference. IWRRRI also has the capacity to provide statewide distribution of professional short courses and professional development workshop as available to statewide water professionals. IWRRRI continues to network and coordinated to work on a regional level with other institutes and water research entities. Finally, the IWRRRI continues its support of the Idaho State Chapter of the American Water Resources Association by recruiting members and providing sponsorship and publicity for several of its events.

During the current project year, IWRRRI also sponsored the Palouse Water Summit, held in Moscow, ID in October of 2013; and the Idaho Water Users Conference, held in Boise, ID in January 2014.

Floodplain Managers Conference

DRAFT - PRELIMINARY CONFERENCE PROGRAM

Wednesday, November 13, 2013				
9AM - 5PM	<p style="text-align: center;"><u>Optional Activities</u></p> CFM Refresher Course - Separate Registration Required, \$25 fee **Attendance provides additional CFM CEU's **Minimum 10 registratis Required. Location TBD			
1PM-4PM	Field Trip - Arrowrock Dam This is a rare opportunity to get a guided tour of the historic Arrowrock dam. At 350' high it was the tallest dam in the world			
Thursday, November 14, 2013				
8:30AM-9:00AM	Registration - Lobby Area			
9:00AM-12:00PM	<u>Room 1</u>	<u>Room 2</u>	<u>Room 3</u>	<u>Room 4</u>
	Elevation Certificates: When are they needed, how to complete them, what are they for? CRS: Updates to the Community Rating System Manual	HEC With This: Ins and outs of HEC RAS and how to work the Army Corps of Engineers software for floodplain modeling	Erosion and Sediment Control: Techniques for plans and field construction related to best management practices for erosion control	When Floods Recede: Documenting high water marks and other critical information needed after a flood
12:00PM-1:00PM	LUNCH			
1:00PM-5:00PM	<u>Plenary Session - Room 1</u>			
	Key Note Presentation Changes to the NFIP under Biggert Waters Flood Insurance Reform Changing Relationships - Flood Control, Irrigation Operations, Climate Change and Water Resources in Idaho Building Disaster Resilient Communities			
5:00PM	SOCIAL			
Friday, November 15, 2013				
8:00AM-9:00AM	BREAKFAST - Building Our State Floodplain Management Resources			
9:00AM-12:00PM	<u>Plenary Session - Continued</u>			
	Changes in Mitigation Planning and Funding; Integrating Local Hazard Plans Changing Technology - What today's LiDAR and GIS can do for Floodplain Management			
1:00PM-4:00PM	CFM EXAM - Separate Registration Required at www.floods.org			

Conference Attendee Survey Summary

Questions

What is your overall satisfaction of the conference	5	4	3	2	1	NA
	12	23	1			

Comments

Need to unlock all doors in conf room so you can come and go quietly, and have maintenance guys make door locks quieter when open/closed

Over all provided very good information

Great topics, presenters and affordability

Public transportation/local transportation is a challenge. For those that flew in and had no car a shuttle of some sort may be an asset

EC training was very good. Other sessions were ho hum...ie..."Floodplain management relationships" didn't seem relevant to most. "Climate Change" was good but very narrow with no "BIG picture" Summary or outcome

More "101" classes/training.

Friday morning classes were not applicable to me

Excellent

2	What is the overall evaluation of the conference facility, food and logistics?	5	4	3	2	1	NA
	A	27	5	1			
	B	16	12	6	1	1	
	C	7	15	9	1		
	D	24	8	2			
	E	22	10	1			
	F	21	11	3			

Comments

Need better PCOR projector to show much better colors or try different computers until one works

Need better laser pointer to work on the screen

Have 1 row on left reserved seats for speakers so they can see presentations

Registration was a bit slow

Bummer at the green screen background which washed out the colors of slides-esp, red, lighting on speakers when on stage poor.

Really missed red on the projector, but the sound system was great. Loved the social hour, great food

Good Conference

Can't see red on projector

Paypal vs. CMCOIT Card@online reservation, tried for paypal lead me to use credit card

The more education available the better. I have always benefited from these conferences

Video color issues

Breakfast on Agenda should have said "Continental Breakfast"

More opportunities or smaller sessions for networking would be nice

Many visual aids to small for the room

Very good and enjoyed them all, only attended the 14th

Would be good to test projector before hadn for color display but it worked out all right

3	What is your overall effectiveness of the plenary sessions you attended?	5	4	3	2	1	NA
		17	14	3			

Comments

Very good

Climate change discussion really provided no value or tools for flood plain mamagement

LIDAR plenary session probably a little too technical for a plenary general session-doubt that everyone was interested

Ran out of time at the end. Would be good to get a little variety of perspective on both climate change and relations with irrigatiors/canal companies

Timing was tricky-need stronger moderators

Steve Holt did a good job!

Biggers waters was very good. IT would have been nice to have a hand out for communities that we could share with citizens, elceted officials and staff

Not very applicable

Very good discussion and speakers, especially sessions 2 & 3

Would be better to have preplanned way to communicate "out of time" to presenter that is more effective and not embarassing to moderator or speaker-like remote blinking light on the stand?

4 **What is your rating of the overall effectiveness of the concurrent sessions you attended?** 5 4 3 2 1 NA
14 9 4

Comments

Excellent session, attended the sediment session

Angie made the presentation informative and fun by bringing a supplier of erosion control products in to show us sample products. I also enjoyed the stories she shared and comments from experienced attendees

You need more break out sessions. Ie..the Floodplain Technology sessionwas irrelevant to many people. Too Techy for what we do

Good Attended HEC Session

5 **What is your rating of the overall effectiveness of the workshops you attended? Please Indicate which workshop you attended** 5 4 3 2 1 NA
15 10 4 6

Comments

Elevation certificates

Sediment happens

FEMA elevation cert, instructions and group workshops

Elevation certificates

Steve did a great job on the HEC-R4S Session

Very Good, just a little too fast speaking

Elevation certificates

Elevation certificates

Very helpful and applicable

Presentation felt rushed through, I could have had a whole day of this workshop

Erosion

Basic information, well done, but would like a little more advanced discussion

Elevation certificates

Elevation certificates

Sediment happens

HEC-RAS

Flood Certificate

6 What is the rating of the overall effectiveness of the courses you attended (CRS and CFM Refresher Course)? Please indicate which course you attended

5 4 3 2 1 NA

5 4 4

24

Comments

Elevation Certificates

CRS

Elevation Certificates

7 What is the rating of the overall effectiveness of the field trip you attended

5 4 3 2 1 NA

16 1

Comments

Very good/informative field trip

Excellent

Awesome

The field trip was very interesting and informative

Well organized and a unique opportunity

Wish I could have attended

8 Please list suggestions of topics for future NORFMA conferences

CFM Classes

Fish behavior in a flood

Additional Technology

NFIP 101 good idea

Conference in CDA

Hydrology/statistics on flood flow estimates

more mapping training

shuttle service to local hotels

101 Courses

Basic help for new comers

Ordinances discuss "all other agencies" need to be notified or other permits.

How do you know who this is?

Ordinance 101-NFIP101- Preclass on won time for a more advanced class (CFM for course?) That is needed by more people

I need a 101 trainign how to deal with Pre-Firm additions, and a small group of 101 Q&A

Insurance

Grants

Actual insurance rating examples

- 9** Are you interested in actively participating in NORFMA by serving on a committee amongst other members and professionals to help develop guidance and direction to floodplain management issues?

Comments

Sure, Alan Crhisty, Elmore County, achristy@elmorecounty.org

Kevin McCarthy

- 10** Are you willing to help with organizing future NORFMA events and conferences

Comments

Maybe (Alan Christy)

- 11** Are you willing to consider serving as a board member?

Comments

Maybe (Alan Christy)

Interested in working with NORFMA in community outreach-to elected officials, to general citizenry: Jane Suggs, Suggs Community Solutions
jbsuggs@cableone.net

Additional Comments

Social at the Stonehouse was great

Floodplain technology presentation was outstanding, could expand on this in the future

Thanks for a great conference, good job!

Thank you!

Overall, a good conference, I look forward to future training opportunities

Thank you for all your hard work

Provide 1.5 hours when lunch on your own

Don't spend too much time w/speaker/introductions & allow them to speak

Did not attend on Friday, but what I attended was all outstanding

USGS Summer Intern Program

None.

Student Support					
Category	Section 104 Base Grant	Section 104 NCGP Award	NIWR-USGS Internship	Supplemental Awards	Total
Undergraduate	3	0	0	0	3
Masters	2	0	0	0	2
Ph.D.	4	0	0	0	4
Post-Doc.	0	0	0	0	0
Total	9	0	0	0	9

Notable Awards and Achievements

For Project 2012ID182B: This project provides the most definitive dataset documenting the limited contribution of nutrients to the Boise River from agricultural sources. With impending reductions in phosphorus discharge from sewage treatment plants, this work will provide a baseline to evaluate the impact of that change.

For Project 2012ID183B: T. Buxton written up in InsideScience.org science blog (December 6, 2012) after AGU presentation. <http://www.insidescience.org/content/salmon-agents-riverbed-erosion/866>