

DHS Bulletin



FY11 - No. 1

July through September 2010

Publications, Books, and Presentations

Journal Articles

Groeneveld, D.P., J.L. Huntington, D.D. Barz. 2010. Floating brine crusts, reduction of evaporation and possible replacement of fresh water to control dust from Owens Lake bed, California. *Journal of Hydrology*. 392:211-218.

Shanafield, M.A., R.B. Susfalk, and K.C. Taylor. 2010. Spatial and temporal patterns of nearshore clarity in Lake Tahoe from fine resolution turbidity measurements. *Lake and Reservoir Management*, 26(3):178-184. doi: 10.1080/07438141.2010.504064.

Zhang, Y. 2010. Moments of tempered fractional advection-dispersion equations. *Journal of Statistical Physics*, 139:915-939.

Zhang, Y., B. Baeumer, and D. M. Reeves. 2010. A tempered multiscaling stable model to simulate transport in regional-scale fractured media. *Geophysical Research Letters*, 37:L11405, doi:10.1029/2010GL043609.

Book

Albright, W.H., Benson, C.H., and Waugh, W.J. 2010. *Water Balance Covers for Waste Containment: Principles and Practice*. ASCE Press, Reston VA.

New Projects

Monitoring Protocols for Utah's Rare Aquatic and Terrestrial Mollusks

PI: Don Sada

Agency: State of Utah – Division of Wildlife

Amount: \$32,256

Summary: The goal of this project is to compile mollusk sample methods and prepare standardized protocols that can be used by Utah Division of Wildlife Resources (UDWR) personnel to sample populations and track changes in abundance and distribution of rare aquatic and terrestrial mollusks in the State. This information can be used to determine population status. If populations are declining, this information will enable implementation of conservation strategies to protect habitats, increase abundance, and discourage listing species as either threatened or endangered. This project will provide UDWR with early warning tools to identify problems then quickly prepare and implement management actions to enhance populations and prevent future listings.

Development of a Regional Water Management Plan for the Carson River Watershed

PI: Alexandra Lutz

Agency: Carson Water Subconservancy District / DOI - Bureau of Reclamation

Amount: \$27,000

Summary: This project evaluates changes in runoff in the Carson River Watershed.

Collaborative Research: Climate, Ice Dynamics and Biology using a Deep Ice Core from the West Antarctic Ice Sheet Ice Divide

PI: Ken Taylor

Agency: National Science Foundation

Amount: \$237,280

Summary: The main science objectives of the project are to investigate climate forcing by greenhouse gases; initiation of climate changes; stability of the West Antarctic Ice Sheet; and cryobiology in the ice core

Tablet-Based Visualization Interfaces

PI: Daniel Coming

Agency: Idaho Nat'l Lab - Battelle Energy Alliance (INL-BEA) / DOE

Amount: \$19,999

Summary: Desert Research Institute shall: Port relevant parts of the Toirt Samhlaigh user interface to a wireless touch-screen tablet; Evaluate wireless touch-screen tables, such as iPad and Nokia N900, and acquire one for this project; Port VRUI menus and widgets to the wireless touch-screen tablet; Add capability to Toirt Samhlaigh to use tablet-based VRUI menus and widgets; and Attend SIGGRAPH conference with INL staff to evaluate and discuss new technologies, review progress, and coordinate activities.

Water Supply Study of Grass Valley, NV

PI: Clay Cooper

Agency: 7Q10, Inc.

Amount: \$14,845

Summary: DRI will review existing well logs from the Nevada State Engineer's Office, masters' theses, and reports from the Nevada Bureau of Mines and Geology and U.S. Geological Survey. The data will be reviewed for subsurface geology, general characteristics of the aquifer (thickness, depth to saturated zone, hydraulic gradient), and aquifer hydraulic properties (hydraulic conductivity, storage coefficient, and porosity). Data review will lead to the development of a conceptual model in which the geologic and hydrologic properties and controls of groundwater flow are proposed, and boundary locations and properties are defined.

CMG Collaborative Research: Tempered Stable Models for Preasymptotic Pollutant Transport in Natural Media

PI: Yong Zhang

Agency: National Science Foundation

Amount: \$315,809

Summary: We will develop tempered stable laws and physical models to study solute transport in aquifers. Fractal power-laws represent a mathematical idealization that must be adjusted to recognize scale effects in natural aquifer material. This adjustment leads to pre-asymptotic, transient anomalous dispersion that can be described by tempered stable laws, which will be the main focus of this project.

Collaborative Research: Aerosol Concentrations, Sources and Transport Pathways within the Arctic Polar Dome during Recent Millennia

PI: Joe McConnell

Agency: National Science Foundation

Amount: \$622,124

Summary: The primary goals of this proposal are to (1) develop unique high-time-resolution, millennial-scale records of biomass burning, dust, volcanic, industrial pollution, and sea salt aerosols for two ice core sites inside the Arctic polar dome and (2) use new and leveraged general circulation models (GCM) and other modeling to interpret these and similar ice core records from outside the polar dome to better understand source regions and transport pathways of aerosols to different regions of the Arctic and their climatic and environmental impacts.

Response of Black Rock-High Rock Emigrant Trails National Conservation Area Springs to Climate Change

PI: Don Sada

Agency: DOI - Bureau of Land Management

Amount: \$250,000

Summary: With the exception of seasonal water provided by winter snow and summer thunderstorms, the majority of water for wildlife and most humans in the Great Basin is derived from groundwater and springs. Springs systems are small, relatively rare, 'biodiversity hot spots' in arid lands. Climate change in northern Nevada is anticipated to decrease precipitation and increase temperatures with a resulting decrease in recharge to the groundwater system (IPCC 2007). It can be assumed that a reduction in spring flow will occur because of decreased groundwater recharge, and that this reduction in discharge will affect dependent aquatic ecosystems. We propose quantifying the potential effect of decreased spring discharge by examining changes in water chemistry, physical habitat, and structure of the benthic macroinvertebrate community by monitoring no more than 12 springs for one year before discharge is decreased during a second year by 0 (control) 10, 25, and 40 percent in replicated (3 replicates per treatment) treatments. This will provide insight into physicochemical and biological change that can be anticipated along a gradient from unaltered to altered flows that may occur from climate change. This study will be coordinated with work by U.S. Geological Survey scientists examining characteristics of northwestern Nevada groundwater flow patterns and recharge.

Collaborative Research: Analysis of McCall Glacier Ice Core and Related Modern Process Studies

PI: Joe McConnell

Agency: National Science Foundation

Amount: \$313,371

Summary: The proposed research addresses two overarching questions related to climate in the eastern Alaskan Arctic: How has climate, terrestrial ecology, and pollutant transport changed over the past 250 years in this region, based on ice core reconstructions from McCall Glacier? and How well can we overcome the challenges of core proxy interpretations from ice cores taken from small polythermal valley glaciers through modern-process studies? To answer these questions we will conduct an inter-disciplinary analysis of ice core proxies, atmospheric dynamics, modern processes, and numerical ice flow modeling.

Evaluation of Nearshore Ecology and Aesthetics

PI: Rick Susfalk

Agency: USDA - Forest Service

Amount: \$90,023

Summary: The nearshore environment of a lake ecosystem often remains a poorly studied area despite its importance to overall biodiversity and function of the lake. This is also true for Lake Tahoe where the nearshore environment also possesses important aesthetic and economic significance for tourism as visitor and resident interactions with the lake occur primarily in the nearshore. While there have been potential improvements to the open water habitat (e.g. clarity) of the lake, basin managers are now turning their attention to understanding nearshore processes. The objective of this proposal is to provide basin management agencies with science-based recommendations for the development of a long-term management and monitoring program for Lake Tahoe's nearshore environment. In particular, this study will focus on the evaluation of environmental indicators that can be used by managers to assess if nearshore desired conditions are being attained. We propose to review and synthesize existing nearshore science, management objectives, and current conditions in order to develop a conceptual model that relates nearshore environmental processes with the desired conditions identified by basin management agencies. Potential indicators will be evaluated for their scientific relevance, feasibility for implementation, and their ability to support management objectives. Scientifically defensible numeric or narrative standards will be suggested where possible. Lastly, a monitoring plan based on these indicators will be developed that addresses the natural temporal and spatial variability found within the nearshore environment.

Spring Survey Training and Data Analysis of Spring Inventory Data for the Sonora and Chiricahua Networks of National Parks

PI: Don Sada

Agency: DOI - National Park Service

Amount: \$89,395

Summary: This project will be conducted to train field crews to survey springs following Level I and Level II protocols prepared for the Mojave Network of National Parks by Sada and Pohlmann (2006). Training will be provided by classroom and field experiences; and

To analyze Level I and Level II data accumulated during Chihuahuan Desert Network (CHDN), Mojave Network (MOJN), and Sonoran Desert Network (SODN) spring surveys and characterize springs in each national park, prioritize springs for monitoring, and make inferences about the associated aquifers to assess susceptibility to climate change based on the size and location of the aquifer and other relevant factors. The results of this analysis will be used to develop the sample designs for spring monitoring across the three networks. A spring inventory in MOJN has already been conducted. Inventories in CHDN and SODN will be conducted in 2010. CHDN and SODN will be responsible for field data collection and data management, and will provide data to Desert Research Institute for the three-network analysis. The product of this analysis will be a single report describing the general results of the analysis with appendices specific to each of the 24 parks in the three networks. The report will include a recommendation of which springs should be included in monitoring programs.

Tahoe Stormwater Particle Assessment and Management for Urban and Roadway Runoff

PI: Alan Heyvaert

Agency: USDA - Forest Service

Amount: \$144,729

Summary: The urban portion of the watershed contributes about 70% of the fine sediment that is delivered to Lake Tahoe. These fine particles significantly affect water clarity in this otherwise pristine lake. Current pollutant reduction strategies are targeting their removal through erosion control and stormwater treatment projects. The investment of significant financial resources to improve the Lake's clarity requires that our understanding of the sources, transport and potential for removal of these particles from urban stormwater be accelerated. The intent of this project is to add to our current, yet incomplete knowledge concerning fine particles. Specifically, this project will provide information to (1) help establish reliable, calibrated relationship(s) between turbidity, the mass of size fractionated suspended solids, and the number of <16 µm micron particles in stormwater runoff, (2) provide details on mechanisms involved in the removal of fine particles in vegetated BMP treatment basins and (3) provide data on the efficiency of this type of commonly used BMP while giving recommendations for design characteristics to increase fine particle removal. The Lake Tahoe TMDL (Total Maximum Daily Load) program and associated efforts to improve lake clarity (e.g. EIP) will greatly benefit from increasing our understanding of fine sediment removal and how to measure success.

New Hires (July 2010 - September 2010)

- ✦ Robert McConnell - Hourly Technical (Joe McConnell)
- ✦ Lawrence Layman - Assistant Research Chemist (Joe McConnell)
- ✦ Lindsay Gilbertson - Graduate Research Assistant (Greg Pohl)
- ✦ Kranthi Kumar Potteti - Graduate Research Assistant (Markus Berli)
- ✦ Danvey Walsh - Graduate Research Assistant (Greg Pohl)
- ✦ Stephen Maples - Graduate Research Assistant (Greg Pohl)
- ✦ Rebecca Lawrence - Graduate Research Assistant (Joe McConnell)
- ✦ Allison Abicht - Graduate Research Assistant (Alan Heyvaert/Jim Thomas)
- ✦ Thomas Jackman - Interim Senior Director of CAVCaM (Terry Surles/John Warwick)
- ✦ Jeffrey Daniels - Associate Research Risk Assessment Modeler (John Warwick)
- ✦ Elaine Spangler - Records Management Specialist (Chuck Russell)

Did You Know...

- ✦ Anna Knust is providing technical editing services for DHS. This service is covered by the Division. Anna will focus on (1) competitive proposals, (2) journal articles, (3) project reports, and (4) non-competitive proposals, as needed by DHS faculty.
- ✦ Barbara Kennedy is retiring after 20 years with DHS. Her last day is October 28, 2010. Please stop by and wish her well!
- ✦ David Smith and Hal Voepel both received the Maxey Fellowship for FY11.
- ✦ Jena and Justin Huntington are now happy parents. Jax Green Huntington was born on 10/05 at 11:27 am, 4 lbs 14 oz, 17 1/2 inches. Congratulations!
- ✦ To get your copy of "Water Balance Covers for Waste Containment: Principles and Practice," go to: <http://www.asce.org/Product.aspx?id=2147489020>



Reminder – Turn clocks back at 2:00am on November 7

DOE Contract Proposals

Proposals under the DOE-Nevada Site Office umbrella contract have been developed and submitted during the last several months in anticipation of the new federal fiscal year. DRI's proposals compete against those submitted by Los Alamos and Livermore national laboratories, Navarro-Intera, the USGS, and NSTec, as the DOE contract only provides a funding vehicle for awarding work, not a guarantee. This year, 41 projects were awarded for a total amount of **\$6,607,025**, in addition to several ongoing tasks that are part of the Yucca Mountain Federal Initiative. Congratulations to the following PIs (carryover tasks are not listed below), and thanks to Susan DeSilva and Karen Gray who managed the submissions and related project control functions:

Project	PI	Approved Budget
Community Environmental Mon. Program	Hartwell	\$1,597,334
Cultural Resources Monitoring Program	Beck	\$1,000,000
Soils TTR Air Monitoring	Shafer	\$233,324
Soils Cultural Resources	Beck	\$109,005
Fire Erosion Monitoring	Shafer	\$173,024
Channel Contaminant Transport	Miller	\$39,027
Soils Project Management	Shafer	\$89,282
Soils Technical Support	Shafer	\$98,332
Drainage Analysis	Miller	\$167,995
Frenchman Flat Playa Rad. Transport	Hershey	\$153,856
Project 57	Shafer	\$128,409
Yucca Flat Monitoring	Shafer	\$352,948
Timber Mountain Station	Lyles	\$54,969
Frenchman Flat CADD/CAP	Chapman	\$108,631
UGTA Document Rev.	Russell	\$54,768
UGTA Mgmt. Support	Russell	\$229,379
Rainier Mesa SubCAU Model	Reeves/Parashar	\$381,904
WPM Aquifer Testing ER-20-8 lower	Russell/Healey/Lyles	\$118,936
WPM Aquifer Testing ER-20-8 upper	Russell/Healey/Lyles	\$123,766
WPM Aquifer Testing ER-EC-12 lower	Russell/ Healey/Lyles	\$70,592
WPM Aquifer Testing ER-20-4	Russell/ Healey/Lyles	\$122,899
WPM Drilling ER-EC-15	Russell/ Healey/Lyles	\$32,068
WPM Drilling ER-EC-16	Russell/ Healey/Lyles	\$31,104
Frenchman Flat Archeology	Beck	\$35,504
QAPP Compliance	Russell	\$90,164
WPM DOC-C14	Hershey/Russell	\$273,921
WPM C1 Recharge	Hershey/Russell	\$370,723
Regional Model Collaboration	Pohlmann	\$248,695
SWEIS Support	Chapman	\$22,855
Solar EA Support	Chapman	\$81,809
Solar Cultural Resources	Beck	\$43,906

Proposals (submitted July thru September 2010)

Date Submitted	PI(s), CO-PI(s)	Sponsor	Title	Status	Funding (\$)
13-Jul-10	Chen, Li	DOI - Bureau of Reclamation	Impact of Climate Change on Coupled Surface-Subsurface Water System and Ecosystem in Arid and Semi-arid Regions	Pending	151,032
21-Jul-10	Coming, Daniel	NSF	CAREER: PAVE - Photorealism Advancing Virtual Environments	Pending	1,050,848
29-Jul-10	Thomas, Jim	UNR	Walker Basin Project, Phase 2	Funded	1,706,317
30-Jul-10	Cooper, Clay	7Q10, Inc.	Water Supply Study of Grass Valley, NV	Funded	14,845
4-Aug-10	Chief, Karletta	EPA	Navajo Nation Capacity Building for Community-Based Climate Change Adaptation Planning	Pending	314,960
16-Aug-10	Lutz, Alexandra	U.S. Civilian Research & Development Foundation (CRDF)	Canal lining and afforestation to prevent raised groundwater tables and field salinization in Khorezm, Uzbekistan	Pending	14,713
8-Sep-10	Pohlmann, Karl	DOI - National Park Service	Water Resources Management Plan and EIS Phase I, Mojave National Preserve	Pending	33,518
8-Sep-10	Shafer, David	DOE	ESER Base and Basis	Pending	307,320
21-Sep-10	Huntington, Justin (PI) Mejia, John and Pohl, Greg	NSF	Collaborative Research: The Capacity and Resiliency of Groundwater Storage to Modulate Climate Change Impacts on Humans and Ecosystems: an Earth Systems Modeling Approach	Pending	1,041,797