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# ARIZONA HYDROLOGICAL SOCIETY

## 24<sup>TH</sup> ANNUAL SYMPOSIUM

***Watersheds Near and Far:  
Response to Changes  
in Climate and Landscape***

**September 18 – 20, 2011**

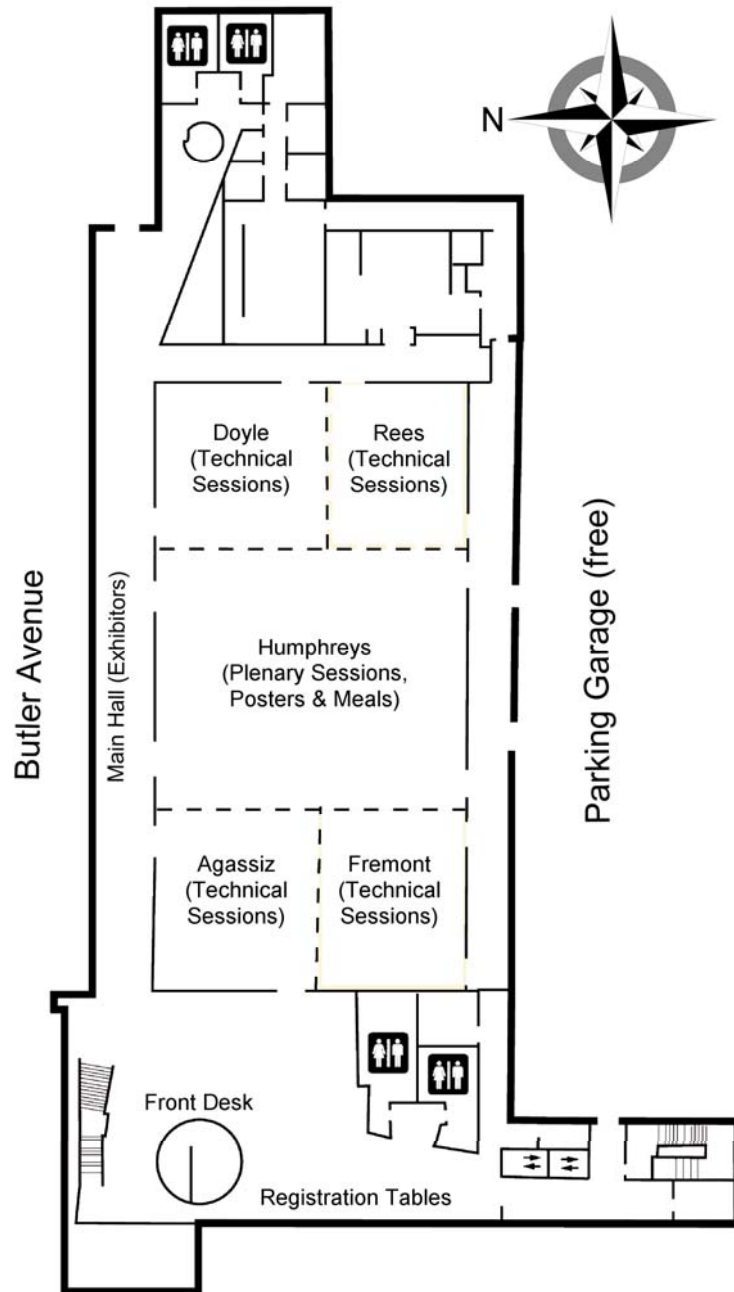
**High Country Conference Center  
Northern Arizona University  
Flagstaff, Arizona USA**

Symposium hosted by the



**ARIZONA  
HYDROLOGICAL  
SOCIETY**

## High Country Conference Center (First Floor)



### About the Arizona Hydrological Society

Did you know that with your registration to this symposium, you received a **Complimentary 1-Year Arizona Hydrological Society Membership**? For all of you that have been loyal members, thank you for your continuing support of AHS. For those of you new to the Society - **Welcome!** We hope this symposium has been an excellent experience for you and that you have attended many interesting sessions, enjoyed our fascinating field trips and workshop, had the opportunity to visit with our exhibitors, and met many new colleagues in the field of water resources. We also hope that you continue as a member for many years to come.

**So what is the Arizona Hydrological Society (AHS)?** Formed in 1985, AHS is a nonprofit organization of nearly 400 water resource professionals dedicated to advancing hydrology and water resource research, planning and development. We have chapters in Tucson, Phoenix and Flagstaff. For more information on the Arizona Hydrological Society, please visit our website at: <http://www.azhydrosoc.org>.

### Planning Committee Members

**Chair:** Bradley Hill, City of Flagstaff

**Committee:**

Alan Dulaney, City of Peoria and AHS President  
 Dana Downs-Heimes, CH2M HILL  
 Margot Truini, US Geological Survey  
 Erin Young, Fluid Solutions  
 John Cochran, Peabody Energy  
 Aregai Tecle, Northern Arizona University, School of Forestry  
 Abraham Springer, Northern Arizona University, School of Earth Sciences  
 and Environmental Sustainability  
 Paul Whitefield, National Park Service  
 Charles Ester III, Salt River Project  
 Michael Tomlinson, University of Hawaii, Oceanography

**Meeting Planning:**

Al Wynant, Event Interface

## Plenary Speaker Biographies

### Monday Morning:

**W. Paul Miller, PhD** – Dr. Miller works for the US Bureau of Reclamation, Lower Colorado Region in the Boulder Canyon Operations Office (Reclamation). His primary responsibilities include working closely with Hoover, Davis, and Parker Dams to ensure delivery of Colorado River Water to lower division states (California, Arizona, and Nevada) and Mexico, aiding in development of Reclamation's 24-Month Study Model and Annual Operating Plan, and investigating impacts of climate change to the Colorado River Basin. He obtained his PhD in Civil and Environmental Engineering from the University of Nevada, Las Vegas in 2010.

**David A. Brown, JD** – Attorney, Brown & Brown Law Offices, Mr. Brown specializes in Arizona water rights law including Gila River & Little Colorado River adjudications and Indian water rights settlements. Mr. Brown is also the Co-Chair, ADWR's Water Resources Development Commission and was previously Chairman of the Apache County Board of Supervisors. He obtained his Juris Doctorate from Arizona State University.

### Monday Lunch:

**Grady Gammage, Jr., JD** – Attorney, Gammage & Burnham. Mr. Gammage, Jr. is a part time academic, practicing lawyer, an author, a sometime real estate developer and a former elected official. He is also a Senior Fellow at Arizona State University's Morrison Institute where his work there focuses on urban growth and development, quality of life and local economic issues. He also served on the Central Arizona Project Board of Directors for 12 years. He obtained his Juris Doctorate from Stanford University.

### Tuesday Morning:

**Daniel G. Neary, PhD** – Science Team Leader and Research Soil Scientist, USFS Rocky Mountain Research Station. Dr. Neary's current research is on the watershed-scale effects of prescribed fire and wildfires on soils and water resources and is an Adjunct Professor at the University of Arizona, Northern Arizona University and the University of Florida. He obtained his PhD from Michigan State University.

## Exhibitors

**Accutest Laboratories** – Beth Proffitt, bethp@accutest.com, 602-501-5673

**Aquatic Informatics** – Jim Wilford, jim@aquaticinformatics.com, 877-870-2782

**Bill Johnson Equipment Co.** – Tim Collins, tim\_bjeqco@qwestoffice.net, 602-275-5415

**Boart Longyear** – Greg Zekoff, gzekoff@boartlongyear.com, 480-226-5485

**Clear Creek Associates** – Marvin Glotfelty, mglotfelty@clearcreekassociates.com, 480-659-7131

**CompassTools** – Lee Ann Fleming, APR, leeann.fleming@yahoo.com, 303-594-1750

**E.L. Montgomery** – Juliet McKenna, JMckenna@elmontgomery.com, 520-881-4912

**Electronic Data Solutions** – Steve Combe, steve@electdata.com, 801-791-3407

**Engineering and Environmental Consultants, Inc. (EEC)** – Mike Hulst, mhulst@eecphx.com, 602-248-7702

**Golder** – Jenny Bush, Jbush@golder.com, 480-966-0153

**Groundwater Environmental Services** – Donielle Majka, dmajka@gesonline.com, 866-518-7971 X3694

**Peabody Energy** – John Cochran, Jcochran@peabodyenergy.com, 928-913-9215 (banner only)

**Salt River Project** – Charlie Ester III, Charlie.EsterIII@srpnet.com

**Schlumberger** – Katherine Matheny, KMatheny@slb.com

**SonTek/YSI** – Christina Iarossi, ciarossi@sontek.com, 858-546-8327

**US Geological Survey** – Rebecca Coronel, rcoronel@usgs.gov, 520-670-6671 X227

**WDC Exploration** – Eric Brue, ericbrue@wdcexploration.com, 480-813-4486

**Zonge Engineering** – Norm Carlson, norm@zonge.us, 520-327-5501

## Detailed Technical Program

Please review signs at registration desk for changes to program.

### Sunday, September 18, 2011

**8:00 am to 5:00 pm:** *Schultz Fire and Flood Field Trip* –

Trip Leaders/Organizers: Dan Neary (USFS), Ann Youberg (AZGS) & Karen Koestner (USFS)

**12:00 to 5:00 pm:** Exhibit Setup (Main Hall)

**12:00 to 5:00 pm:** Poster Setup (Humphreys)

**6:00 to 8:00 pm:** Registration, Exhibits & Icebreaker (Main Hall)

### Monday Morning, September 19, 2011

Registration, Exhibits, & Posters

Breakfast 6:00 to 8:00 am

Welcome & Plenary Session – 8:00 to 10:15 am

Room: Humphreys

Speaker	Affiliation	Title
Bradley Hill	AHS Symposium Chair and City of Flagstaff	Introductions
Hon. Sara Presler	Mayor, City of Flagstaff	Welcome
Dr. Laura Huenneke	NAU Vice President of Research	Welcome
Paul Miller	US Bureau of Reclamation	Guest Speaker
David Brown	Brown & Brown Law Offices	Guest Speaker

### Monday Morning, September 19, 2011

Exhibits, Posters & Break – 10:15 to 10:30 am

Rooms: Main Hall & Humphreys

### Tuesday Late Morning – Afternoon, September 20, 2011

Lunch – 11:30 am to 12:30 pm

AHS Awards, CAP Awards, Scholarship Awards,

Lifetime Achievement Award

Room: Humphreys

**Beaver Creek Field Trip – 1:00 to 5:00 pm**

Trip Leaders: Dr. Aregai Teclé (NAU) & Dr. Abe Springer (NAU)

Meet in the HCCC Lobby, refreshments provided.

**Workshop – 1:30 to 5:00 pm**

***Making Sense of Nondetects and Data Analysis\**** (Agassiz)

Workshop Leader: Dr. Dennis Helsel (Practical Stats)

**Please note – You do NOT need to be registered for the symposium to attend this workshop. The cost is \$50.**

**\*ATTENTION:** This workshop leads into a 2-day course titled *Untangling Multivariate Relationships* being offered by Dr. Dennis Helsel (Practical Stats) on Wednesday and Thursday (September 21 and 22, 2011) at the USGS Water Science Center, 2255 N Gemini Drive, Flagstaff, AZ 86001. Dr. Helsel is offering this normally \$795-course for \$650 to 2011 AHS Symposium Registrants. More information about this course and Dr. Helsel's firm Practical Stats can be found at: <http://www.practicalstats.com>.

The 2011 AHS Symposium Planning Committee extends a **SPECIAL THANK YOU** to the following organizations:

- NAU Bilby Research Center for media type-setting, printing and field trip planning;
- NAU School of Earth Sciences and Environmental Sustainability for field trip logistical support; and
- US Geological Survey, Arizona Water Science Center for media production.

**Tuesday Morning, September 20, 2011**

**Paleohydrology & Sedimentary Environments – 9:45 to 11:25 am**

Moderator: Nancy Hornewer

Room: Fremont

Speaker	Affiliation	Title
<b>Malcolm Alter 9:45-10:05 am</b>	GCNP Research Permit	New Findings Related to Potential Groundwater Contamination from Mineralized Breccia Pipes on the Colorado Plateau
<b>Philip Pearthree 10:05-10:25 am</b>	Arizona Geological Survey	Mapping Holocene River Alluvium Along the Verde River, Central Arizona

**Tuesday Morning, September 20, 2011**

**Alternative Approaches for Water Supplies – 9:45 to 11:25 am**

Moderator: Greg Bushner

Room: Doyle

Speaker	Affiliation	Title
<b>Michael Block 9:45-10:05 am</b>	Metro Water District	How to Buy a Recharge Project on Credits Instead of Cash and What the CARFAX Revealed
<b>David Christiana 10:05-10:25 am</b>	Arizona Department of Water Resources	FLOW - Water for People's New Data Collection Tool
<b>Richard Shroads 10:25-10:45 am</b>	Civiltec Engineering	A Proposed New Category of Water for Arizona: Macro-Harvested Rainwater

**Monday Morning, September 19, 2011**

**Schultz Fire Drainage I – 10:30 am to 12:10 pm**

Moderator: Dana Downs-Heimes

Room: Agassiz

Speaker	Affiliation	Title
<b>Ted Lehman 10:30-10:50 am</b>	JE Fuller Hydrology & Geomorphology Inc.	Schultz Fire Drainage Master Plan - Hydraulics & Sediment Analyses
<b>Dan Neary 10:50-11:10 am</b>	USFS Rocky Mountain Research Station	Rill and Gully Formation Following the 2010 Schultz Fire
<b>Ann Youberg 11:10-11:30 am</b>	Arizona Geological Survey	Rainfall and Geomorphic Aspects of Post-Fire Floods and Debris Flows - Schultz Fire 2010
<b>Dan Neary 11:30-11:50 am</b>	USFS Rocky Mountain Research Station	Rock Gabion, Rip-Rap and Culvert Treatments: Successes and Failures in Post-Fire Erosion Mitigation, Schultz Fire 2010

**Monday Morning, September 19, 2011**

**Watersheds/Drought/Restoration – 10:30 am to 12:10 pm**

Moderator: Floyd Marsh

Room: Fremont

Speaker	Affiliation	Title
<b>Abe Springer 10:30-10:50 am</b>	Northern Arizona University	Sustainable Large-Scale Forest Restoration Treatments in Arizona with Watershed Benefits: The Groundwater Story
<b>Dominic La Roche 10:50-11:10 am</b>		Effects of Severe Drought on a Desert Riparian Woodland

Speaker	Affiliation	Title
<b>Jon Philipp</b> 11:10-11:30 am	The Source Group, Inc.	The Amargosa Conservancy's Amargosa River Hydrologic Survey, Amargosa River Basin, California & Nevada
<b>Mark Murphy</b> 11:30-11:50 am	GeoSystems Analysis, Inc.	The Nature and Protection of Dryland Watersheds
<b>Kelly Mott Lacroix</b> 11:50 am-12:10 pm		Arizona Water Management Along the Adaptive Cycle: What Can the Ebb of Water Governance Teach Us About Future Flow?

### Monday Morning, September 19, 2011

#### Water Supply I – 10:30 am to 12:10 pm

Moderator: Donald Bills

Room: Doyle

Speaker	Affiliation	Title
<b>Bradley Hill</b> 10:30-10:50 am	City of Flagstaff	City of Flagstaff Water Resources Current Challenges, Long-Term Needs and Economic Analysis of Future Options
<b>Ed McGavock</b> 10:50-11:10 am	Montgomery & Associates	Future Water Supplies in Verde Valley
<b>Vic Heilweil</b> 11:10-11:30 am	US Geological Survey	Evaluating Sources of Water to Littlefield Springs, Arizona
<b>Dave Carr</b> 11:30-11:50 am		Groundwater Resource Evaluation for the Sonoran Solar Energy Project
<b>Blake Abts</b> 11:50 am-12:10 pm	Tres Rios Consulting Engineers	Wells 16 & 17 Installation and VFD Design, City of Douglas, AZ

### Tuesday Morning, September 20, 2011

#### Registration, Exhibits, & Posters

Breakfast 6:00 to 8:00 am

Plenary Session – 8:15 to 9:30 am

Room: Humphreys

Speaker	Affiliation	Title
<b>Dan Neary</b>	USFS Rocky Mountain Research Station	Guest Speaker

### Tuesday Morning, September 20, 2011

#### Exhibits, Posters & Break – 9:30 to 9:45 am

Rooms: Main Hall & Humphreys

#### Groundwater Recharge & Replenishment – 9:45 to 11:25 am

Moderator: Ted Lehman

Room: Agassiz

Speaker	Affiliation	Title
<b>Deborah Tosline</b> 9:45-10:05 am	US Bureau of Reclamation	The Enhanced Recharge Demonstration Project - Collaboration, Construction and Monitoring of an In-Channel Recharge Project
<b>Floyd Marsh</b> 10:05-10:25 am	Sustainable Water Solutions, LLC	Sustainable Water Management through Reclamation and Recharge: Implementation Challenges of Three Case Studies
<b>Jon Chorover</b> 10:25-10:45 am	University of Arizona	Interdisciplinary Studies of the Critical Zone in the Upper Colorado and Rio Grande River Basins
<b>Muniram Budhu</b> 10:45-11:05 am	University of Arizona	Predicting Flow and Groundwater Movements from Aquifer Storage and Recharge Facilities

Speaker	Affiliation	Title
<b>Brent Travis</b> 4:10-4:30 pm	WEST Consultants, Inc.	Riverbank Groundwater Response to Storm Events: Analytical Solutions and Applications
<b>Enrique Triana</b> 4:30-4:50 pm	MWH Americas, Inc.	Use of a River Basin Simulation Model and Decision Support System to Evaluate Water Supply Alternatives for a Planned Mine Expansion in an Arid Region of Southern Peru

### Monday Evening, September 19, 2011



**5:00 to 6:30 pm** – Shuttle from Drury Inn to Hart Prairie Lodge (9,300 feet), Arizona Snowbowl (shuttle leaving every 15-20 minutes)

**5:45 to 6:30 pm** – Annual Arizona Hydrological Society Membership Meeting on the Hart Prairie Lodge deck (free keg beer)

**5:30 to 9:30 pm** – Cash bar at Arizona Snowbowl, keg beer (free while it lasts), and house wine

**6:00 to 9:00 pm** – Entertainment by **THE KNOCKABOUT'S** with a break for dinner at **6:45 pm**

**8:00 to 9:30 pm** – Return shuttle to Drury Inn (leaving every 15-20 minutes)

**Directions to the Arizona Snowbowl** – In Flagstaff, I-17 becomes Milton Road. Continue driving north for 3 miles. Milton Road will go under the railroad tracks and the road will bear to the right. Take a left at the first stop light (Humphreys Street). At the third stop light (Hwy 180), turn left. Continue 7 miles to Snowbowl Road and then turn right (just past mile marker 222). The resort is 7 miles up Snowbowl Road.

### Monday Morning, September 19, 2011 Water Chemistry/Quality I – 10:30 am to 12:10 pm Moderator: Robert Hart Room: Rees

Speaker	Affiliation	Title
<b>William Vernieu</b> 10:30-10:50 am	US Geological Survey	Physical and Chemical Data for Water in Lake Powell and from Glen Canyon Dam Releases, Utah-Arizona, 1964-2011
<b>Michael Tomlinson</b> 10:50-11:10 am	University of Hawaii, Oceanography	Using Principal Component Analysis to Identify Element Sources in Hawaiian Watersheds
<b>Kimberly Beisner</b> 11:10-11:30 am	US Geological Survey	Preliminary Assessment of Metal Contamination in Water at Tavasci Marsh, Arizona
<b>James Callegary</b> 11:30-11:50 am	US Geological Survey	Surface-to-Groundwater Transport of Contaminants at Tumacácori National Historical Park
<b>Doyle Wilson</b> 11:50 am-12:10 pm	Lake Havasu City	Monitoring Pharmaceuticals and Personal Care Products at an Effluent Injection Site, Lake Havasu City, Arizona

### Monday Noon, September 19, 2011 Lunch 12:15 to 1:30 pm Room: Humphreys

Speaker	Affiliation	Title
<b>Grady Gammage, Jr.</b>	Gammage & Burnham	Guest Speaker

**Monday Afternoon, September 19, 2011**

**Schultz Fire Drainage II – 1:30 to 3:10 pm**

Moderator: Dana Downs-Heimes

Room: Agassiz

Speaker	Affiliation	Title
<b>Karen Koestner</b> 1:30-1:50 pm	USFS Rocky Mountain Research Station	Depositional Characteristics and Sediment Availability Resulting from the Post-Schultz Fire Floods of 2010
<b>Jamie Macy</b> 1:50-2:10 pm	US Geological Survey	Geophysical Investigation of Cinder Lake to Determine Depth of Unconsolidated Cinders and Potential Storage Capacity for Runoff Events Exacerbated by the Schultz Fire, 2010, Coconino County, Arizona
<b>Steve Skotnicki</b> 2:10-2:30 pm	HydroSystems, Inc.	Characterization of the Subsurface at Cinder Lake Using CSAMT, TEM and nanoTEM

**Monday Afternoon, September 19, 2011**

**Watershed/Climate Modeling – 1:30 to 3:10 pm**

Moderator: Ed McGavock

Room: Fremont

Speaker	Affiliation	Title
<b>Chris Courtney</b> 1:30-1:50 pm	AMEC Geomatrix, Inc.	The Agua Fria National Monument (AFNM) Intra-Basin Water Management (IBWM) Project
<b>Frank Postillion</b> 1:50-2:10 pm	Pima County Regional Flood Control District	Protection of Shallow Groundwater Dependent Riparian Ecosystems in Pima County
<b>Aregai Teclé</b> 2:10-2:30 pm	Northern Arizona University	Hydrologic Modeling to Determine Water Yield from an Arizona Forested Watershed

**Monday Afternoon, September 19, 2011**

**Climate Change & Watershed Management – 3:30 to 4:50 pm**

Moderator: Bradley Garner

Room: Fremont

Speaker	Affiliation	Title
<b>William Miller</b> 3:30-3:50 pm	US Bureau of Reclamation	Predicting Future Regime Shifts in Streamflow Over the Gunnison River Basin
<b>Daniel Bunk</b> 3:50-4:10 pm	US Bureau of Reclamation	Changing Evaporative and ET Demands in the Lower Colorado River Basin Under Different Climate Scenarios
<b>Adrian Harpold</b> 4:10-4:30	University of Arizona	Changes in Snowmelt Timing and Snow Water Partitioning in the Intermountain West
<b>Seshadri Rajagopal</b> 4:30-4:50 pm	University of Arizona	Assessing Impacts of Climate Change in a Semi-Arid Watershed Using Statistically Downscaled IPCC Climate Output

**Monday Afternoon, September 19, 2011**

**Numerical Modeling II – 3:30 to 4:50 pm**

Moderator: Abe Springer

Room: Doyle

Speaker	Affiliation	Title
<b>Alexander Baish</b> 3:30-3:50 pm	Arizona State University	Participatory Modeling for Hydrologic Planning: An Application to Catastrophic Flooding in Nuevo Leon, Mexico, after Hurricane Alex
<b>Jeffrey Kennedy</b> 3:50-4:10 pm	US Geological Survey	Arizona Flood Frequency Analysis: Updated Tools and

**Monday Afternoon, September 19, 2011**

**Water Chemistry/Quality II – 1:30 to 3:10 pm**

Moderator: Robert Hart

Room: Rees

Speaker	Affiliation	Title
<b>Jeff Bower</b> 1:30-1:50 pm	Tres Rios Consulting Engineers	Short Course for Arsenic Removal: Practical Planning & Design for Removing Arsenic from Groundwater Production Wells
<b>Doug Bartlett</b> 1:50-2:10 pm	Clear Creek Associates	Heisenberg and Groundwater Plumes: How the Investigation of a Plume Can Change It

**Monday Afternoon, September 19, 2011**

**Exhibits, Posters & Break – 3:15 to 3:30 pm**

Rooms: Main Hall & Humphreys

**Monday Afternoon, September 19, 2011**

**Geophysical Investigations – 3:30 to 4:50 pm**

Moderator: Jamie Macy

Room: Agassiz

Speaker	Affiliation	Title
<b>Greg Bushner</b> 3:30-3:50 pm	Vidler Water Company	What to Drill: Red or Blue? Using CSAMT and NSAMT in Siting Groundwater Production Wells in Southeastern Nevada
<b>Norman Carlson</b> 3:50-4:10 pm	Zonge International, Inc.	Groundwater Exploration in the Edgewood, New Mexico, Using CSAMT
<b>Chris Jones</b> 4:10-4:30 pm	University of Arizona	TDR-EC: A Rapid Subsurface Characterization of Particle Size & Hydrologic Properties

Speaker	Affiliation	Title
<b>Wes Swaffar</b> 2:30-2:50 pm	Northern Arizona University	Payment for Watershed Services: A Tool for Supporting Southwestern Watershed Stewardship?
<b>Kevin Werner</b> 2:50-3:10 pm	NOAA/CBRFC	Forecasting for the Future

**Monday Afternoon, September 19, 2011**

**Numerical Modeling I – 1:30 to 3:10 pm**

Moderator: Abe Springer

Room: Doyle

Speaker	Affiliation	Title
<b>David Sampson</b> 1:30-1:50 pm	Arizona State University	A Coupled Surface and Groundwater Water Management Model for Metropolitan Phoenix
<b>Shuyun Liu</b> 1:50-2:10 pm	Arizona Department of Water Resources	Development of an Updated Regional Groundwater Flow Model for Pinal Active Management Area, Arizona
<b>Dale Mason</b> 2:10-2:30 pm	Arizona Department of Water Resources	Tucson AMA Groundwater Flow Model - 2011 Update
<b>Keith Nelson</b> 2:30-2:50 pm	Arizona Department of Water Resources	Prescott AMA Groundwater Flow Model - 2011 Provisional Update
<b>Bradley Garner</b> 2:50-3:10 pm	US Geological Survey	Water Budgets for the Middle Verde River Watershed, Arizona, Showing Possible Effects of a Future Groundwater Withdrawal and Recharge Scenario, 2005 - 2110

September 18-20, 2011  
Flagstaff, Arizona

Arizona Hydrological Society  
24th Annual Symposium

## Watersheds Near and Far: Response to Changes in Climate and Landscape

### 2011 AHS Symposium Program at a Glance

<b>Sunday, September 18, 2011 – Registration, Field Trip, Exhibits, and Icebreaker</b>		<b>Location</b>
8:00 am - 5:00 pm	Schultz Fire & Flood Field Trip, lunch and refreshments provided	HCCC Lobby
12:00 pm - 5:00 pm	Exhibitor set-up	Main Hall
12:00 pm - 5:00 pm	Poster set-up	Humphreys
6:00 pm - 8:00 pm	Registration, Exhibits & Icebreaker	Main Hall
<b>Monday, September 19, 2011 – Registration, Plenary &amp; Technical Sessions, and Exhibits</b>		<b>Location</b>
6:00 am - 8:00 am	Registration, Exhibits & Posters, Breakfast 6:00 am to 8:00 am	Main Hall & Humphreys
8:00 am - 8:30 am	Welcome - Hon. Sara Presler (Mayor, City of Flagstaff) and Laura Huenneke (NAU Vice President of Research)	Humphreys
8:30 am - 9:15 am	Plenary Session Guest Talk 1 - Paul Miller (USBR), Guest Speaker	Humphreys
9:30 am - 10:15 am	Plenary Session Guest Talk 2 - David Brown (Brown & Brown Law Offices), Guest Speaker	Humphreys
10:15 am - 10:30 am	Exhibits, Posters & Break	Main Hall & Humphreys
10:30 am - 12:10 pm	Schultz Fire Drainage I (Moderator - Dana Downs-Heimes)	Agassiz
10:30 am - 12:10 pm	Watersheds/Drought/Restoration (Moderator - Floyd Marsh)	Fremont
10:30 am - 12:10 pm	Water Supply (Moderator - Donald Bills)	Doyle
10:30 am - 12:10 pm	Water Chemistry/Quality I (Moderator - Robert Hart)	Rees
12:15 pm - 1:30 pm	Lunch: Grady Gammage, Jr., (Senior Fellow, Morrison Institute, ASU; Attorney with Gammage & Burnham), Guest Speaker	Humphreys
1:30 pm - 3:10 pm	Schultz Fire Drainage II (Moderator - Dana Downs-Heimes)	Agassiz
1:30 pm - 3:10 pm	Watershed/Climate Modeling (Moderator - Ed McGavock)	Fremont
1:30 pm - 3:10 pm	Numerical Modeling I (Moderator - Abe Springer)	Doyle
1:30 pm - 3:10 pm	Water Chemistry/Quality II (Moderator - Robert Hart)	Rees
3:15 pm - 3:30 pm	Exhibits, Posters & Break	Main Hall & Humphreys
3:30 pm - 4:50 pm	Geophysical Investigations (Moderator - Jamie Macy)	Agassiz
3:30 pm - 4:50 pm	Climate Change and Watershed Management (Moderator - Bradley Garner)	Fremont
3:30 pm - 4:50 pm	Numerical Modeling II (Moderator - Abe Springer)	Doyle
3:30 pm - 4:50 pm	NONE	Rees
5:00 pm - 6:30 pm	Shuttle leaves every 15-20 minutes from Drury Inn to Arizona Snowbowl's Hart Prairie Lodge (elevation = 9,300 feet)	Drury Inn
5:45 pm - 6:30 pm	ANNUAL AHS MEMBERSHIP MEETING (deck at Hart Prairie Lodge)	Arizona Snowbowl
5:30 pm - 9:30 pm	Cash bar at Arizona Snowbowl, keg beer (free while it lasts), and house wine	Arizona Snowbowl
6:00 pm - 9:00 pm	Dinner and Entertainment - The Knockabouts with a break for Dinner at 6:45 pm	Arizona Snowbowl
8:00 pm - 9:30 pm	Return shuttle to Drury Inn leaving every 15-20 minutes	Drury Inn
<b>Tuesday, September 20, 2011 – Registration, Plenary &amp; Technical Sessions, Exhibits, Field Trip, and Workshop</b>		<b>Location</b>
6:00 am - 08:15 am	Registration, Exhibits & Posters, Breakfast 6:00 am to 8:00 am	Main Hall & Humphreys
8:15 am - 9:30 am	Plenary Session Guest Talk 3 – Dan Neary (USFS Rocky Mountain Research Station), Guest Speaker	Humphreys
9:30 am - 9:45 am	Exhibits, Posters & Break	Main Hall & Humphreys
9:45 am - 11:25 am	Groundwater Recharge and Replenishment (Moderator - Ted Lehman)	Agassiz
9:45 am - 11:25 am	Paleohydrology and Sedimentary Environments (Moderator - Nancy Hornewer)	Fremont
9:45 am - 11:25 am	Alternative Approaches for Water Supplies (Moderator - Greg Bushner)	Doyle
9:45 am - 11:25 am	NONE	Rees
11:30 pm - 12:30 pm	Lunch: AHS Awards, CAP Awards, Scholarship Awards, Lifetime Achievement Award	Humphreys
1:00 pm - 5:00 pm	Beaver Creek Field Trip lead by Dr. Aregai Teclé & Dr. Abe Springer, refreshments provided	HCCC Lobby
1:30 pm - 5:00 pm	Workshop - Making Sense of Nondetects and Data Analysis lead by Dr. Dennis Helsel (Practical Stats)	Agassiz