



JULY 2013 NEWSLETTER

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GOVERNMENT GOINGS-ON

Recent comments by President Obama have made it clear that this administration is getting serious about eliminating coal-fired power plants. The Environmental Protection Agency must now feel truly emboldened to set new rules governing emissions. And because EPA has direct authority over Navajo Generating Station--by virtue of its location on the Navajo Reservation--we are now more likely to see severe restrictions imposed on NGS, restrictions that may require expenditures estimated at \$1.1 billion to meet. The owners may find the cost too great to continue operating the plant, and two participants (Nevada Energy and LAPWD) have already announced plans to withdraw. Coupled with the continuing inability to negotiate a lease for the plant site from the Navajo Nation acceptable to the partners and to the Navajo Tribal Council, the future for NGS is looking extremely uncertain. Reliable and inexpensive power is needed to move Arizona's CAP water; if not from NGS, it must come from somewhere. But to date, Plan B remains invisible.

But with all our attention focused on the politics, legalities, and economics of NGS, are we forgetting the hydrology of the Colorado River system itself?

In June a paper came out in the Bulletin of the American Meteorological Society comparing various models of Colorado River flows, all yielding significantly different results (6-45% reductions). See the abstract at <http://journals.ametsoc.org/doi/abs/10.1175/BAMS-D-12-00228.1?af=R>. The authors concluded that four major factors were responsible for the differences. These included which climate models and emissions scenarios were utilized, how tight the spatial resolution of the model was, how well the land surface hydrology was represented, and how well the resolution of the global climate model was scaled down to meet the requirements of the regional hydrology model. While the degree to which flows can be predicted to be reduced can vary, most models outline diminished flows.

Losses on the system are another factor receiving attention. Recently the Journal of the American Water Resources Association published an article, the abstract of which can be seen at: <http://onlinelibrary.wiley.com/doi/10.1111/jawr.12081/abstract;jsessionid=1D33926A343AA30C732851E292D5E308.d04t02?deniedAccessCustomisedMessage=&userIsAuthenticated=false>. This article looks at variability in estimating seepage losses associated with Lake Powell. Lake Powell sits on the Navajo Sandstone, and it has long been known that a huge water mound is accumulating around the lake since it began filling. The message was that underestimating bank storage losses by using a constant in models would introduce inaccuracies in estimates of future water supplies.

We should never lose sight of the critical nature of hydrology in understanding the Colorado River system. Models are not perfect, but we have to take their predictions into account; it was way over-estimating annual flows on the Colorado River a century ago that got us into trouble in the first place.

Alan Dulaney

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AHS 2013 SYMPOSIUM UPDATE



by Marla Odom, Symposium Chair

The 2013 AHS Symposium, "Shifting Boundaries: Recalibrating the Hydrologic Approach" will be held at the Doubletree Reid Park Hotel by Hilton in Tucson from September 18-21, 2013. The planning committee has been busily putting together technical sessions, workshops, field trips, product exhibition, fun entertainment, and an icebreaker welcome event.

As a result of the economic downturn and its effects on our membership, AHS has decided in recent years to have a "back to basics" approach to our annual symposia. Our goal is to deliver a quality event and networking opportunity at a reasonably reduced price, reflective of the economic times. As such, we have moved to smaller, more intimate venues, more in-line with the original feel of the early symposia of the Society. **Space is limited at the 2013 symposium, and the event is expected to sell out. Register early to guarantee your spot.**

Check our website regularly for the most up-to-date information on events.

<http://ahssymposium.org/2013/>

Sponsors and Exhibitors - Please see update written by Mike Block in this newsletter.

Technical Sessions - We received an incredible response to our Call for Abstracts and have a full technical session slate of over 65 talks, one panel discussion, and 10 poster presentations scheduled. Sessions are being finalized with presenters and will be available online soon for review.

Plenary Sessions - A 2-hour plenary session is planned for both the Thursday and Friday Session dates. **Thursday (September 19)** - Grady Gammage Jr. and Gary Woodard will be delivering a joint presentation titled "Assumptions, Extrapolations, and Outliers: Our Dysfunctional Dialogue Over Water, Environment, and the Future", which explores the question "How do we recalibrate our baseline assumptions and change the way we think about the future?"

Friday (September 20) - Kathy Jacobs, the Assistant Director for the Climate Adaptation and Assessment at the White House Office of Science and Technology Policy will present a talk titled "The National Climate Assessment: Preparing the Nation for Change". Her talk will focus on taking the effects of changes in the hydrologic cycle into consideration in the context of cascading effects of decisions.

Tim Thomure, the Water Reuse Practice Lead for HDR Engineering, will present a talk titled "Potable Reuse – A Changing Conversation". His talk will focus on changes in the way potable reuse is discussed in the water industry and in public settings as a result of the migrating use of recycled water from outdoors, to indoors, to potable use.

Thursday Lunch Presentation (September 19)- Peter Smith, professor of planetary science at the Lunar and Planetary Laboratory in the University of Arizona Department of Planetary Science, will speak on the origins and fate of water on Venus, Earth, and Mars.

Thursday Dinner Event (September 19) - The entertainment for the evening will be local Tucson band [The Tryst](#). The Tryst has an energetic, eclectic, sultry sound rooted in jazz and funk. They have written and produced several studio albums and won multiple awards 4 years in a row at the Tucson Area Music Award (TAMMIES). The Tryst took home a record seven best-in-category TAMMIE awards in 2011, including best new album release, best jazz band, best funk/soul band, best female vocalist, best songwriter, best bassist, and best drummer. In 2012, they took home the TAMMIE for best Jazz band.

There are three plated meal options for the Thursday dinner:

Chicken Parmesan: Breaded chicken breast served with herb-buttered angel hair pasta, finished with marinara sauce and mozzarella cheese

Roasted Prime Rib of Beef: 8-ounce cut of beef served with smoked-gouda, Yukon Gold whipped potatoes, finished with au jus and creamy horseradish

Portabella Mushroom Napoleon: Layers of grilled portabella mushrooms, spicy roasted corn salsa, finished with fresh herbs

A cash bar will be available at the dinner for the purchase of alcoholic beverages.

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Workshops (September 18) - A total of six workshops are currently planned. The workshops listed below are finalized and are up on the website for registration:

Ø MODFLOW-USG — A New Direction in MODFLOW Groundwater Modeling

James Rumbaugh, the co-author of Groundwater Vistas software

Our course is designed to introduce users to the newly released MODFLOW-USG code using Groundwater Vistas, a leading pre- and post-processor for the MODFLOW suite of codes. MODFLOW-USG utilizes finite volume discretization, allowing for use of both horizontal and vertical nested grids as well as irregular grid cell geometry. This increased flexibility in grid design allows for better resolution around key model features and boundaries, as well as allowing the user to sub-discretize individual model layers to better represent complex hydrostratigraphic units. Each model layer can have a different nesting structure, effectively allowing sub-layers and discontinuities to be more accurately modeled than previous versions of MODFLOW. The course structure combines lectures and hands-on computer time that allow participants to explore the concepts covered in the lectures.

Ø Basic Programming and Training on the use of Campbell Scientific Data Acquisition and Remote Data Collection Systems

Josh Hanks, sales and support representative at Intermountain Environmental, Inc.

FREE TO ATTEND. This course will provide an introduction to programming the Campbell Scientific data acquisition and remote data collection systems. These systems measure multiple types of sensors and record the data on internal memory, at user defined intervals. Training will be provided on the basics of programming and the options for transmitting the data to a remote location for analysis and storage. There are a variety of remote data collection options that will be covered, such as, radio, cellular, Wi-Fi and other Internet communication devices. These systems are used in remote locations and have the ability to use small DC power systems with solar recharge. At the conclusion of the class attendees will be able to write a simple program, understand sensor connections, and know how to setup a communication connection with the datalogging device. If time permits, we will also cover publishing of data on the Internet.

Ø Writing Strategies for Earth Science & Water Resource Professionals

Nancy Riccio, Principal, Plateau Technical Communication Services

Most of us in the earth science and water resource fields spend a significant part of our professional lives generating reports, proposals, and other technical documents — despite having received little or no training in how to write effectively. This workshop is a great opportunity to learn some strategies for technical communication from a seasoned writer / editor and former groundwater consultant. We'll analyze real-world examples at the document, paragraph, and sentence levels to identify common pitfalls and explore ways to make your writing clearer and more effective. We'll also learn a few key principles that are guaranteed to make the writing process easier and more enjoyable.

Ø Intro to Water-Management Modeling with GoldSim Dynamic Simulation Software

Jason Lilywhite, PE, GoldSim Technology Group

This hands-on morning session is designed for those who have never used GoldSim before. It will introduce participants to dynamic simulation concepts for water-management modeling. You will become comfortable with GoldSim and develop an

understanding of its capabilities and its potential application to projects. This class is not intended to introduce you to all aspects of the GoldSim framework; you'll need further training and practice to feel comfortable building complex water models.

Ø Hands-on Training for Water Management Modeling with GoldSim Software

Jason Lilywhite, PE, GoldSim Technology Group

Much of the class is hands-on. Following along with the instructor, you will build a basic water management model that you can extend and modify later on. We'll also explore ways to incorporate real-world problems into GoldSim. In addition, you will be introduced to scenario management and post-processing, which are part of this summer's new software release. This session is for those who have some experience using GoldSim. We'll be discussing new features, so it will be helpful for seasoned users as well.

Ø Additionally, a workshop on "**Characterizing, Designing and Operating Surface Spreading Groundwater Recharge Projects**" is still in the planning stage and is being evaluated for feasibility.

Field Trips (September 21) - A total of three field trips are currently planned. The field trips listed below are finalized and are up on the website for registration:

Ø Birds of the Sweetwater Recharge Facility

Leaders: Kendall Kroese, Habitats Program Manager for the Tucson Audubon Society and Bruce Prior, a Lead Hydrologist with Tucson Water

FREE TO ATTEND! The Sweetwater Wetlands is a water treatment facility, an urban wildlife habitat, and an outdoor classroom. As an urban wildlife habitat, this tranquil park allows visitors to view native wildlife in an urban setting. Its water-rich, stream-side, riparian zone supports a huge variety of wildlife including dragonflies, raccoons, hawks, bobcats, and dozens of birds that make the wetlands their full- or part-time home. We'll see waterfowl in the hundreds, regular and visiting warblers, and several exciting species hiding in the reeds. Participants will also learn about the wetland operations that support the avian population.

Ø From Water to Wine: The Hydrogeology of the Elgin Wine District

Leaders: Dale Armstrong (Golder Associates) and Marla Odom (Montgomery & Associates)

Join us for a tour of Southern Arizona wine country — named among the top “10 great places for local wines” by [USA Today Travel](#). Take in the beautiful and interesting roadside geology of the Empire Mountains and the Cienega Creek valley from the comfort of a chartered bus bound for four wineries of the Sonoita/Elgin area. At each winery, you will have the opportunity to sample exquisite wines in friendly tasting-room settings with friends and colleagues. There will be ample room on the coach to transport purchased cases and bottles of wine back to Tucson. **About the Vineyards**

Lightning Ridge Cellars near Elgin serves classic Italian varietals.

Founded in 2010, **Flying Leap Vineyards** is Arizona's newest vineyard specializing in French, Spanish, and Italian varietals.

Callaghan Vineyards is listed as one of six most interesting wineries / winemakers in the U.S. by Parisian daily newspaper *Le Monde*; served on three separate occasions at the White House. “As I have said so many times in the past, this is one of the most interesting wineries in America.” Robert Parker — *The Wine Advocate*. “Astonishing, concentrated and fruity wines. This pioneer symbolizes the spirit of the wines of the New World.”

Dos Cabezas wines have garnered high scores from Wine Spectator Magazine and by Robert Parker's *The Wine Advocate*. They have been served at the White House on multiple occasions.

Ø Additionally, a field trip to Biosphere II to tour the Landscape Evolution Observatory (world's largest artificial watershed) is still in the planning stage and is being evaluated for feasibility.

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2013 AHS SYMPOSIUM SPONSORS/ EXHIBITORS UPDATE

- *Mike Block, Symposium Fundraising Committee Member, Metro Water District*

Sponsorship continues to be fantastic and brisk!!!

All of the premium exhibit spaces have been booked **and only 9 regular exhibit spaces remain (\$650 each)**.

Remember, your Company only has two and half months before the Symposium, so get your booth registration in soon before they go!!!

We greatly appreciate Zonge International upgrading to a Silver Sponsor!

Returning exhibitors include Layne Christensen Company, Stewart Brothers Drilling Company and Yellow Jacket Drilling Services, and GoldSim Technology Group as a new exhibitor

Our thanks to Hargis + Associates for sponsoring two Breaks.

A special thanks to Carollo Engineers, CH2M Hill, and Southwest Ground-water Consultants for each sponsoring the Teachers Workshop. CH2M Hill and Carollo Engineers have each also graciously sponsored Student Symposium scholarships.

Companies and individuals can sponsor for \$100 a Teacher to attend the Project WET Training Workshop. Or for \$100, they can choose to sponsor a Student to attend the Symposium. The expense by companies can be used as business deduction or if made by an individual as a charitable donation.

Other remaining sponsorship opportunities include the Wednesday Icebreaker (\$1,000), the Outdoor Exhibit space (\$450 each), Small Company or Individual sponsor (\$100).

Much thanks to Kay Havenor and Paul Lindberg as Individual donors!

If your firm or agency would like to also be an exhibitor or sponsor, please go to the Symposium AHS website at www.ahssymposium.org/2013 or contact me at (520) 575-8100 or mblock@metrowater.com.

On the behalf of the Symposium Planning Committee, I would like to again thank all of our sponsors noted on the Symposium webpage at <http://ahssymposium.org/2013/sponsors/thanks-to-our-sponsors/> for helping the Symposium reach 90% of its fundraising goal. Your incredible generosity and support will help us make for a successful 2013 Symposium!

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IN MEMORIAM: GREGORY L. WALLACE (1954–2013)

by Bill Victor

June 25, 2013 under [Montgomery & Associates News](#)



Greg Wallace passed away on June 18 after a brief but courageous battle with acute bone cancer. Although his time was cut short at the age of 59, he lived a full and impactful life. Greg was a prominent member of M&A's Phoenix office staff for 8 years and provided excellent consulting services to our clients, specializing in assured and adequate water supplies and groundwater resources development. Prior to coming to M&A, Greg spent 17 years with ADWR as Chief Hydrologist and ultimately as Assistant Director. Over the years, he advised many state, county, and local leaders on water resource issues affecting all Arizonans. He helped promulgate and/or implement many of the groundwater regulations and guidelines we live under today, including the Groundwater Management Act. During his tenure, the Department received accolades for its forward-thinking programs and became a national model in several areas.

It is a testament to Greg's important, positive, and often behind-the-scenes contributions to our industry that he is so well known and respected by his colleagues, clients, and adversaries alike. Those benefitting from his guidance and insight include many political leaders, commissioners, attorneys, water resource scientists, developers, agriculturalists, and water purveyors. Everyone could always rely on Greg's forthright and honest manner of "telling it as he saw it" — and using his broad knowledge of Arizona water resources to provide well-guided and often novel solutions to complex issues.

Greg was a good friend and colleague, and he will be missed greatly. He was famous for his wry sense of humor, which he used to great effect in nearly all of his interactions with people. Those who knew Greg were not surprised to learn that he had dabbled in standup comedy earlier in his life; even bedridden and terribly sick; he managed to brighten the spirits of those around him with his positive attitude, quick wit, and sense of humor.

Greg's family has announced that a service to honor him will be held Sunday, July 7, at 6:30 pm at the Living Streams Church, located at 7000 N. Central Ave., Phoenix, AZ. They ask that cards or remembrances be sent to P.O. Box 73271, Phoenix, AZ 85050, and that any flowers for the service be sent to the Living Streams Church.

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2013 AHS / AHSF ACADEMIC SCHOLARSHIPS

Applications for the 2013 AHS / AHSF Academic Scholarship have been received. The quality of applicants and applications was superior. The scholarship committee has completed its review of the applications and selected three applicants who will each receive a \$2,000 scholarship. The winners will be announced and awards presented during the awards luncheon at the annual Symposium on Friday, September 20.

PHOENIX CHAPTER NEWS

Phoenix Chapter Dinner Meeting

The next Phoenix Chapter dinner meeting will be held on **Tuesday, July 9, 2013**, at Nello's in Tempe (northeast corner of McClintock & Southern, just north of U.S. Highway 60 (the Superstition Freeway)). Please join us for a beverage, to share business cards, and to talk water!

Location: Nello's
1860 E. Southern Avenue
Tempe, AZ 85282

Event: **Hot Topics from Central Arizona Project, and Their Implications for the Water Industry**

Guy Carpenter, Vice President, Carollo Engineers;
Member of the Board of Directors of the Water Reuse Association.

Chapter Board Meeting: 5:00 PM – 5:30 PM

Happy Hour & Dinner: 5:30 PM – 7:00 PM

Program: 7:00 PM – 8:00 PM

Cost: \$15 member, \$20 non-member, \$5 student

RSVP with Michele Robertson at <mailto:mirobertson3@gmail.com> or 480-432-7417.

Hope to see you there!

At the July Phoenix Chapter meeting, Guy Carpenter, Vice President at Carollo Engineers and CAP Board Member, will give a presentation on some hot topics from Central Arizona Project and their implications for the water industry, and also some perspective on his experiences as a relatively new CAP Board member.

Guy Carpenter has a bachelor's degree in Chemistry from NAU, and began his career working on groundwater remediation and air quality monitoring projects in California. He then worked as the pretreatment program manager, wastewater superintendent, and water resources manager for Gilbert, Arizona. Since 2001, Guy has been working as a consultant, focusing on water resources master plans, recharge projects, and water reuse. He obtained his Civil Engineering PE in 2006, and currently serves as Carollo's national practice group leader for water resources and reuse. Guy is presently involved in the development of the AZ Water Association's "Arizona Water Network" as a member of the Leadership Committee. In November 2012, he was elected by Maricopa County voters to a 6-year term on the Board of Directors of the Central Arizona Project.

Abstract:

The Central Arizona Project (CAP) annually delivers over 1.5 million acre-feet of Colorado River water to central and southern Arizona. It is a 336-mile long system of aqueducts, tunnels, pumping plants and pipelines and is the largest single resource of renewable water supplies in the state of Arizona. The 15-member Board of Directors is responsible for setting policies, establishing tax and rate schedules, and taking other action regarding the operation and maintenance of the CAP and repayment of debt to the Federal government for its original construction. Current topics of interest to the water community include regulations on power production that will raise water prices, the distribution of non-Indian agriculture water to new recipients of it, groundwater replenishment obligations and associated water supplies, the CAP's role in international water treaties and new water supplies, and aging infrastructure - among other topics. Guy will speak about these topics and offer his perspective as a water industry professional.

Future Event Calendar (see also calendar on www.azhydrosoc.org)

Ø **No Phoenix Chapter meetings in August or September. Please join us at the 2013 AHS Symposium in Tucson, September 18-21, 2013.**

Ø **Tuesday October 8, 2013**, at the SunUp Brewing Company in Phoenix:

Kelly Mott Lacroix, Water Resources Research Center, College of Agriculture and Life Sciences, University of Arizona will speak to us about **Understanding Environmental Flows: The Arizona Environmental Water Needs Assessment.**

We're starting to plan for presentations at meetings starting in **February 2014**. Please contact [Tom Walker](#), Phoenix Chapter Vice President, if you would like to give us a presentation or if you know anyone else who could use an audience.

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3RD ANNUAL AHS WINE TASTING FUNDRAISER



When: Tuesday July 23, 2013
6:00 pm to 8:30 pm
Where: Terroir Wine Pub
7001 N. Scottsdale Rd. #157
Scottsdale, AZ 85253

What: Tasting five fine wines selected by the co-owner of Terroir Wine Pub (Rich Petrus, a long-time AHS member) and accompanying appetizers to help fund the **Herman Bouwer**

Scholarship/Internship program.

Who: AHS Members, Students (must be 21 years of age) and Non-members

Cost: \$30 per person donation (additional donations will be accepted)



The event is limited to the **first 30** people who sign up!

Raffle: As a bonus we are having a canned food drive to help the food banks in the Metro Area. Anybody who brings nonperishable food items (cans, pasta, peanut butter etc) will receive a raffle ticket for some gifts (one ticket per item).

This event is sponsored by [Terroir Wine Pub](#), [Accutest Laboratories](#), [Southwest Exploration Services](#), and [Yellow Jacket Drilling Services](#). Thank you!

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TUCSON CHAPTER NEWS

There will No regular dinner meeting in July! Please check back for details as they come available on our upcoming August dinner meeting at <http://www.azhydrosoc.org/tucson.html>.

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FLAGSTAFF CHAPTER NEWS

The AHS-Flagstaff Chapter and the American Institute of Professional Geologists (AIPG) are in the process of evaluating possible venues for our joint 2014 Symposium to be held in Northern Arizona. A Request for Proposals (RFP) was drafted and distributed to 14 potential vendors via the online Cvent® system. We received a total of five proposals from Flagstaff, Sedona, and Prescott; six vendors turned us down primarily because they were too small to accommodate an event estimated to have 200 registrants and three vendors did not reply to our RFP. Site visits were conducted at four of the proposed venues; the High Country Conference Center was not revisited having been the venue during the 2008 and 2011 venues. An evaluation matrix, a modification of Cvent®'s Excel®-based *Bid Report*, was prepared and distributed to AHS and AIPG members actively involved in the 2014 Symposium planning. We hope to identify the venue for the 2014 Symposium at the end of June or the first week in July 2013.

We are actively soliciting suggestions from AHS members for plenary or keynote speakers for the 2014 Symposium. If you have any suggestions, please send them to Margo Truini (mtruini@usgs.gov).

AHS-Flagstaff will host the Corporate Board Meeting scheduled for 20-July-2013 (Saturday) and, once again, Dana Downs-Heimes (AHS-Flagstaff Treasurer) and her husband Keith Heimes have graciously offered their home as the site for this meeting. For those of you that remember the photo of the San Francisco Peaks that figured so prominently during the 2011 Symposium, it was taken from their home. If you are interested in attending the Corporate Board meeting, please contact Mike Tomlinson (tomlinson86@q.com) so he can keep a tally of attendees and send you directions.

The July meeting of the AHS-Flagstaff Chapter will be on Thursday 25-July-2013 from 1800-2000 MST. The location has yet to be determined. Please contact Mike Tomlinson (tomlinson86@q.com) for information. If you do come to this meeting, please come with some ideas for the 2014 Symposium plenary or keynote speakers.

Finally, John Cochran has prepared an excellent summary (below) of the AHS-Flagstaff field trip to Blue Canyon. Thank you John and Norman Honie (Hopi Nation) our Hopi Guide (and new AHS member) for organizing and leading this field trip and for preparing the summary report.

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BLUE CANYON FIELD TRIP SUMMARY

by John Cochran

On Saturday, May 18, the Flagstaff Chapter sponsored a field trip to Blue Canyon along Moenkopi Wash located on the Hopi Reservation. Twelve participants met our guide Norman Honie, Director of the Hopi Tribe's Office of Mining and Mineral Resources in Kykotsmovi, Arizona at about 10 am. The group then proceeded to a pullout along State Route 264 where Norman provided background about Hopi culture, pointed out the village of Old Oraibi including historical and cultural perspectives, and showed us a nearby rock quarry used by the Hopi for building homes and other village features.

The group then proceeded along dirt roads to a point overlooking Blue Canyon above Moenkopi Wash. There, Margot Truini and Paul Lindberg described geologic formations evident from this westerly view including the Mancos Shale, Dakota Sandstone, Carmel Formation, and the Navajo Sandstone. While there, Norman described many of the native grasses and other plants used by the Hopi for food and cultural purposes including Mormon Tea.



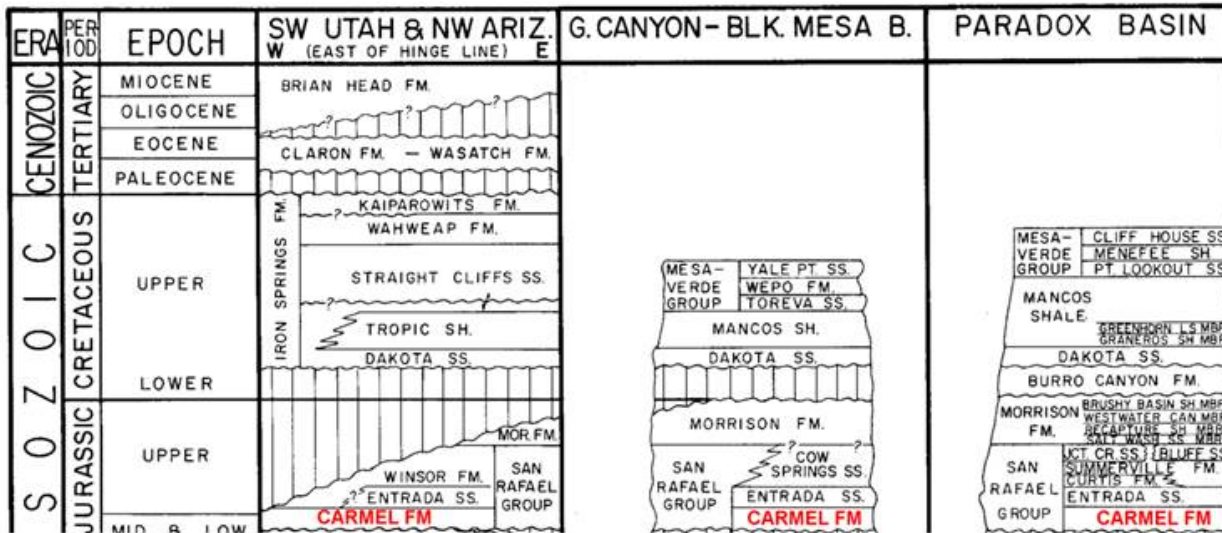
Afterward, the group drove into Blue Canyon and parked on a terrace above Moenkopi Wash. There, we walked through the ruins of what originally housed a trading post from 1882 to about 1889, a school for the Western Agency Indian Service from 1899 to about 1903, and another trading post from 1916 to about 1920. A good summary of the history of this site can be found in the August 1959 issue of Arizona Highways. Norman provided additional history of these ruins during our roaming of the remains of the structures. Following lunch, the group proceeded along a path that led down along the exposed Navajo Sandstone outcrop that has been carved by millennia by flash floods in Moenkopi Wash into a deep and narrow slot canyon. One interesting feature is a crushed automobile stuck in the upper portion of the slot canyon that was transported by a very large flash flood several decades ago according to Norman Honie. Just downstream of the slot canyon, Moenkopi Wash features perennial flow that is maintained by groundwater discharge from the Navajo Sandstone for several miles along a meandering sand-bed channel. This is one of only two perennial reaches of streams within the Hopi Reservation. Further upstream, Moenkopi Wash is ephemeral, and features high vertical banks of alluvial deposits comprised of variable layers of silt and sand interspersed with relatively thin layers of gravels and cobbles that speak to a long history of varying flow regimes over centuries.

Following our walk along Moenkopi Wash, the group drove across the valley and walked amongst very interesting red and white erosion features comprised of the Carmel Formation. According to Norman, these features have cultural significance to the Hopi. The rock formations are similar to those found in the Valley of the Gods in southeastern Utah (hoodoos), and also feature linear striations that Paul Lindberg explained as calcite deposits formed due to fractures in the formation over time. After a group photo session, we drove a long, sandy and sometimes rough dirt road to State Route 160, and then back to Flagstaff.

The trip was a wonderful experience filled with geologic and historical wonders and of course, cultural and historical perspective from the Hopi. The Flagstaff Chapter is greatly appreciative of Norman Honie's work and time arranging permission from the Hopi Tribe for conducting this field trip. Norman's great sense of humor, patience with all of us, and his historical and cultural information provided during this unique field trip were well received.



NOMENCLATURE CHART OF THE GRAND CANYON & ADJACENT AREAS



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HYDRO-NEWS

ADEQ ACCEPTING APPLICATIONS FOR UP TO \$1.2 MILLION IN WATER QUALITY IMPROVEMENT GRANT FUNDS

The Arizona Department of Environmental Quality (ADEQ) is excited to announce the distribution of our [Water Quality Improvement Grants \(WQIG\) Request for Grant Applications \(RFGA\)](#). Applications are currently being accepted for **\$1.2 million in Water Quality**

Improvement Grants (WQIG) during fiscal year 2014. ADEQ is requesting applications to fund projects that implement on-the-ground water quality improvements to reduce nonpoint source pollution. ADEQ is placing an emphasis on the implementation of activities identified through planning efforts in priority sub-watersheds where water quality and watershed planning activities have taken place. The goal is to encourage successful community-based approaches and management techniques to protect and restore Arizona's watersheds, ultimately bringing waters assessed as 'Impaired' back into attainment for water quality standards.

Mandatory pre-proposals for the grants will be due on **Friday, Aug. 9** and final applications on **Friday, Sept. 20**. The grant awards are expected to be announced in February 2014. Priority for funding is being given to areas where ADEQ has established watershed implementation plans including Granite Creek near Prescott, Oak Creek near Sedona, San Francisco River near Clifton and San Pedro River near St. David.

Three web-based seminars about the grants will be conducted Monday, July 15 from 2 p.m. until 3:30 p.m.; Wednesday, July 17 from 10 a.m. until 11:30 a.m.; and Monday, July 22 from 2 p.m. until 3:30 p.m. Registration is required two days before each webinar, Please contact Jake Breedlove at (602) 771-4243 or sb12@azdeq.gov to register and for more information.

The full request for grant applications can be downloaded from the ADEQ website at <http://www.azdeq.gov/environ/water/watershed/improvement.html>

Information about the WQIG program, including the grants manual and application forms are available on ADEQ's website at www.azdeq.gov/environ/water/watershed/improvement.html or by calling ADEQ at (602)771-4243 or 1-800-234-5677, Ext. 771-4243.

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ARIZ. ALLIES, FOES OF CLIMATE PLAN QUICK TO REACT

By **Brandon Loomis**

The Republic | azcentral.com

Wed Jun 26, 2013 12:55 PM

President Barack Obama's call Tuesday for carbon-emission restrictions at coal-fired power plants drew angry responses from Republicans in Arizona's congressional district and praise from environmentalists who called it overdue.

The president ordered the Environmental Protection Agency to begin a public process to create the first rule that would regulate carbon from new and existing plants. Coal plants, including one that helps power much of the Southwest and pumps Colorado River water to Phoenix, are the nation's largest source of greenhouse gases.

Navajo Generating Station near Page is the West's largest coal-fired plant and already is the subject of proposed EPA rules to reduce haze at a cost of up to \$1 billion.

Read more: <http://www.azcentral.com/news/politics/articles/20130625ariz-allies-foes-climate-plan-quick-react.html>

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THE ECLIPSE OF COAL: AN ENERGY SOURCE ON ITS WAY OUT

Pasqualetti: Solar, natural gas make more sense for state

By **Mike Pasqualetti**

Fri Jun 28, 2013 3:42 PM

Recent interest in the future of the Navajo Generating Station near Page is part of a larger dialogue about the future of coal-fired power plants everywhere, and the signs are that we are, after more than a century-long marriage, falling out of love with coal.

Regionally, California's Senate Bill 1368 is pushing local utilities to divest themselves of coal, including their shares of NGS. Nevada is following suit with Senate Bill 123, which clears the way to sell its share of NGS and to close the Reid Gardner plant near Moapa, Nev.

To make up the difference, both states plan to rely on efficiency, renewables and natural gas. In fact, they are working together on this approach. Los Angeles, for example, will be purchasing 250 megawatts of solar power from the Moapa Band of Paiutes, one of the groups that worked to retire Reid Gardner. To put that into concrete terms, every hour the solar plant runs at full capacity, it will produce 20 times more electricity than my Tempe house uses in a year.

Coal is also losing momentum nationally. It dropped from 50 percent in 2005 to 35 percent in 2012, driven by cheap natural gas. Fifty-two gigawatts (about 16 percent of the existing coal fleet) have been announced for retirement by 2025.

For their part, environmental groups are applauding this downward trend. They link the use of coal to global warming, rising sea levels, diminished visibility, several respiratory disorders and the egregious rearrangement of landscapes from the mountaintop-removal brand of coal-mining.

Read more: <http://www.azcentral.com/opinions/articles/20130607coal-navajo-generating-station-viewpoints.html>

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PLAN TO ALLOW COPPER MINE NEAR SUPERIOR CLEARS A CONGRESSIONAL HURDLE

By Erin Kelly

Republic Washington Bureau
Fri May 17, 2013 8:58 AM

WASHINGTON- A land swap that would pave the way for the creation of North America's biggest copper mine near Superior was approved on Wednesday by a key House panel.

The bill, backed by former political rivals Reps. Paul Gosar, R-Ariz., and Ann Kirkpatrick, D-Ariz., passed the House Natural Resources Committee by a vote of 23 to 19. Gosar, who serves on the committee, voted for it, while fellow Arizona Rep. Raul Grijalva, a Democrat, voted against it.

The legislation, first introduced eight years ago, is expected to move to the House floor for a vote later this year.

The bill would allow Resolution Copper to exchange more than 5,000 acres of environmentally sensitive land it owns throughout Arizona for about 2,400 acres of federal land near Superior. The company would develop a 7,000-foot-deep mine there, opening the third-largest undeveloped copper resource in the world.

"This land exchange and conservation bill is the direct result of years of negotiations, an open process and a common vision amongst its supporters to bring good paying jobs to Arizona," Gosar said after the vote.

The committee approved the copper mine project in July 2011 and sent it to the full House, where it passed three months later and is likely to pass again in this session. The bill died in the Senate, where its future remains uncertain.

Read more: <http://www.azcentral.com/community/pinal/articles/20130516plans-to-allow-copper-mine-near-superior-clears-a-congressional-hurdle.html>

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AS POPULATION, SEWER USE GO UP, SO DO ENERGY COSTS

June 09, 2013 12:00 am • [Tony Davis Arizona Daily Star](#)



When it comes to water, energy and the environment, there is no free ride.

Cleaner wastewater from sewage plants needs much more energy than dirty wastewater. So does renewable water for drinking and watering golf courses, compared to the energy used by groundwater pumping. But that groundwater pumping had for decades threatened to hollow out the aquifer under Tucson's core.

These tradeoffs resonate clearly in a recent study of greenhouse gas emissions and energy use in the Tucson area, done by the Pima Association of Governments, a regional planning agency.

First, the study showed that more people and better sewage treatment requires more electricity to run the air blowers, clarifiers, fans and odor scrubbers that do the work.

Energy use and emissions of heat-trapping greenhouse gases from Pima County's wastewater treatment system soared from 2000 to 2010, the study showed. Those increases occurred at a faster rate than in any other major area of local government, it said.

Since 2000, "the Wastewater Department in Pima County has gone through a tremendous transformation, from minimally treated sewage to sophisticated advanced processes," said Jackson Jenkins, the county's wastewater chief, explaining the steep increase in energy use and greenhouse gas emissions.

Read more at http://azstarnet.com/news/science/environment/as-population-sewer-use-go-up-so-do-energy-costs/article_064766b0-bc15-52a8-bd9f-c2bd26bc9402.html

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ROSEMONT MINE'S WATER PERMIT UPHELD

Administrative law judge rejects 19 issues raised by opponents

June 18, 2013 12:00 am • [Tony Davis Arizona Daily Star](#)

Rosemont Mine opponents failed to prove that the mine would harm groundwater supplies, an administrative law judge has ruled.

Law Judge Thomas Shedden upheld the mine's aquifer protection permit from the state, saying opponents didn't show that the Arizona Department of Environmental Quality's granting of the permit was "arbitrary, unreasonable, unlawful or based upon a technical judgment that was clearly invalid."

Shedden's ruling last week dismissed 19 issues raised by 11 individuals and five environmental groups opposing the proposed mine. They contended the state permit will allow Rosemont Copper to pollute local groundwater supplies.

If Shedden's decision is upheld by the state Water Quality Appeals Board, litigation will be the opponents' only recourse on the water permit, which ADEQ issued a little more than a year ago.

The permit allows the company to discharge materials if it can show that it's using the best-known technology to prevent pollutants from reaching groundwater.

The appeals board will hear the case on July 8.

The company seeks to mine 243 million pounds of copper annually in an open pit in the Santa Rita Mountains southeast of Tucson.

Read more at http://azstarnet.com/news/science/environment/rosemont-mine-s-water-permit-upheld/article_fef6ef07-67e4-552e-ac2a-ec37e0203264.html

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GRIJALVA PUSHING FOR FEES ON MINES

Bill would make firms pay royalties, establish hard-rock cleanup fund

June 23, 2013 12:00 am • [Tony Davis Arizona Daily Star](#)

U.S. Rep. Raúl Grijalva of Tucson and two others are bringing back an oft-tried bill to overhaul the country's 142-year-old hard-rock mining law and charge royalties for copper and other non-coal mining operations on public lands.

The bill would also prevent mining on certain kinds of environmentally sensitive public lands and establish an abandoned mine cleanup fund, paid for by a separate fee on mining companies.

The royalty would be set at 12.5 percent on the gross income derived from mining claims on federal land.

Mining companies have long opposed a royalty of that size but have said they'd be willing to support a lesser but as yet undetermined royalty.

If the royalty - the same as paid by oil and gas companies leasing federal lands - were established, the new bill would have it used to pay down the annual federal budget deficit, or to reduce long-term national debt if no annual budget deficit exists.

Read more at http://azstarnet.com/business/local/grijalva-pushing-for-fees-on-mines/article_1ff50655-9c67-50d9-af11-efc8ca880491.html

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Membership may be renewed by credit card through the AHS website or by mailing a check to the Arizona Hydrological Society, P.O. Box 1882, Higley, AZ 85236. Dues remain at \$45.00 year for regular membership and \$15.00 for students. Please remember that your 2011 membership was included in the 2010 Symposium registration fee!