



Well Said

SPRING 2017 • Newsletter of Arizona Water Well Association for our Members and Friends



**Saturday April 15, 2017
Membership Meeting**

**COCO's Restaurant
2026 N. 7th St.
Phoenix, AZ**

8:30am—Meet & Greet/Networking
9:00am— Speaker: Norman V. Howard
Cotey Chemical

'Water Well Rehabilitation'

Business meeting will follow the speaker presentation.



REGISTRATION

Name: _____
Company Name _____
Address: _____
City: _____ State: _____ Zip: _____ Phone: _____
Email: _____

Number of people attending : _____

_____ Fax registration to 480-609-3939 or mail to:
950 E. Baseline Rd. #104-1025, Tempe, AZ 85283

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Email: admin@azwwa.org

SAVE THE DATE

Hope to see you there!!

The AzWWA Annual Golf Tournament, Membership
Meeting, Picnic and Chili- Cook Off will be held

Friday and Saturday,

June 16 and 17, 2017

Agenda

Friday June 16, 2017

Golf Tournament
Quailwood Greens Golf Course
Dewey, AZ
9am Shotgun start

Membership Meeting Steak Fry
Goldwater Lake, Prescott, AZ
5:30pm

Saturday, June 17, 2017

Picnic, Horse Shoe Tournament (starting at 8am), Chili- Cook Off
and Live Auction
Goldwater Lake, Prescott AZ

Please join us for this fun event! Watch for more details.

Any questions, email admin@azwwa.org or call 480-609-3999

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Prescott's Overflowing Lakes Now Benefiting Groundwater Recharge Overflowing Lakes Help Augment Groundwater

Article and Photo by Cindy Barks; Reprinted from the Daily Courier



City of Prescott employees John Johnson, left, and Al Fishback open the valve that will allow water that is spilling over the Watson Lake Dam to flow into the underground pipeline that transports water to the city's recharge field near the airport. The valve, which is located off Highway 89, is expected to divert about eight million gallons per day from Granite Creek.

The water in Willow Lake reached the top of the spillway on Feb. 6th and currently is flowing over the lake dam – the first time the northeast-Prescott lake has been completely full in several years, say city officials.

Prescott's lakes are not the only bodies of water in Arizona that are currently full to the brim. Even as local residents enjoy the completely full and overflowing conditions at Willow and Watson lakes this winter, the lake and dam system downstream along the Verde River has also filled up. And that is now benefiting the City of Prescott's groundwater recharge – nearly a month and a half before normal.

Salt River Project (SRP) reported Feb. 17th that it will begin releasing water from the Verde system to the Salt River and into the riverbed below Granite Reef Dam. That requires the Phoenix-area utility company to notify the City of Prescott of the condition, which, in turn, triggers Prescott's ability to divert water from Granite Creek to the city's groundwater recharge field near the airport earlier than usual.

By the terms of a decades-old court stipulation, Prescott normally can take water from the lakes for recharge only from April through November.

Jeff Lane of SPP's media relations department explains that the requirement dates back to a dispute that arose when the Chino Valley Irrigation District (the previous owners of Willow and Watson lakes) "built the cross-cut canal between Willow Lake and Watson Lake in the late 1960s without the proper water-right authority."

The dispute was resolved through a settlement, which stipulated the April-to-November timeframe for CVID's diversion of Granite Creek water, Lane said. (The requirement was transferred to Prescott when the city bought the lakes from CVID in 1998.) One exception: During "spill events."

"This allows Prescott to divert Granite Creek water for recharge prior to April 1," Lane said, adding that the spill situation has occurred several times over the years – "most recently in 2010."

And the water-rich situation could continue. "Depending if this winter storm pattern continues or dies up like it did last year in January, we expect releases at Granite Reef to continue through March, and perhaps into April," Lane said.

After receiving word from SRP late Feb. 16th, city wastewater workers were out early Friday morning to open a valve that diverts water from Granite Creek into an underground channel, and onto Prescott's recharge field at the Airport Wastewater Treatment Plant.

(Continued on page 4)

(Continued from page 3)

There, the water is allowed to seep into the ground and replenish the aquifer. The recharged water results in water credits for the city, which can then be allocated to new development as “alternative water.”

For now at least, the water diversion will not affect the levels of Willow and Watson lakes. “We will not release anything from either lake,” said Prescott Utilities Manager Craig Dotseth on Thursday. “There is enough natural flow over both spillways.”

Scott Gregorio, city wastewater superintendent, said the valve that workers opened Friday diverts only a portion of the water that is currently flowing over the Watson Lake Dam.

As city workers Al Fishback and John Johnson slowly opened the valve at a spillway located off Highway 89, Gregorio explained that the diversion would amount to about eight million gallons per day. “We open it gradually,” Gregorio said, adding that workers check daily to ensure that the water is flowing unobstructed through the recharge pipeline. After opening the valve at about 8 a.m., the water will take four to six hours to travel through the approximately four-mile pipeline to the airport-area recharge field, Gregorio said.

The valve off Highway 89 differs from the valves that the city typically opens on the dams of Willow and Watson lakes during drier years.

Depending on the levels of the lakes from April through November, city policy calls for withdrawing water from the lakes to augment its water recharge. The policy was set by the city in 1998 during the lakes purchase.

In the past, the city has withdrawn water from the lakes – mostly from Watson – throughout the spring, which tends to bring the lake levels down. The city typically halts its withdrawals in about May to allow for fish-spawning to go on undisturbed.

Currently, both lakes continue to overflow at the dam spillways. Dotseth said Willow Lake filled up and began flowing over the spillway on Feb. 6th, after which the city closed the cross-cut canal that flows under Highway 89, connecting the two lakes.

The city had opened the canal on Dec. 27th to help fill Willow Lake, which typically fills slower than Watson Lake, because of a smaller drainage area. Watson Lake began overflowing its spillway on Jan. 3.

WELCOME BACK MEMBER!



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James (Jim) and Katharine (Kathy) Collum can be reached at:

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In Memoriam



John William "Bill" Myers III passed away with his family by his side on Feb. 22, 2017, in Phoenix, AZ. He was born July 2, 1958, in Holbrook.

Bill Myers, son of Bill and JoAnn Myers, grew up in Holbrook and attended Holbrook High School, where he excelled in track and field. That is also where he met the love of his life, Linda. He graduated in the Class of 1976 and Bill and Linda were married in September of the same year.

He and Linda moved to Flagstaff in 1978 and started Flagstaff Well and Supply Co. Bill was a third-generation water well driller, and provided drilling and pump services across Northern Arizona. As a water well professional, Bill served as president of the Arizona Water Well Association, and worked with state and national legislatures to protect groundwater. Bill made many great friends through his business and truly loved his career.

It was also in Flagstaff, that Bill and Linda raised their three children. As a devoted father and family man, he always strived to make sure his children had the best and found great joy in watching their accomplishments. He was full of personality and character, had a great sense of humor and was always quick to bring a smile to others.

He enjoyed riding motorcycles, boating, the outdoors, travel and music, as well as discussing history and politics. Later in life he found great joy in playing with his seven grandchildren and sharing his many hobbies with them. Bill served faithfully through the years in many callings in the Church of Jesus Christ of Latter-Day Saints, always willing to lend a hand to others and serve wherever he was needed. He and Linda were sealed for time and all eternity in the Mesa Arizona Temple on Sept. 24, 1988.

He is survived by his wife and best friend, Linda Myers, of Flagstaff; his children, Christi (Eric) Carlson of Flagstaff, Cody (Marianne) Myers of Houston, Texas, Corey Myers of Flagstaff; his parents, Bill and Joann Myers, of Holbrook; and sister Jackie (Greg) Long of Holbrook. He is also survived by his grandchildren, Chase, Preston, Porter, Wylie, Baylee, Bryce and Kynlee, as well as a large extended family who loved "Uncle Billy," and a countless number of dear friends. He was preceded in death by his grandparents Bill and Jacora Myers.

Funeral services were held Friday, March 3, at the LDS Church in Flagstaff. Visitation was at 9 a.m. with the funeral immediately following at 10 a.m. Billy will be missed by many!!

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Information provided by Mike Ball, ADWR

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| Clay Jackson Myers, Jr. (Jack) | 1980 – 2010 | Holbrook, AZ |
| Robert Earl Myers | 1980 – 1981 | Holbrook, AZ |
| John William Myers, Sr. | 1980 – 1985 | Holbrook, AZ |
| Kenneth Myers | 1984 – 1985 | Holbrook, AZ |
| <u>License No. 336</u> | <u>Flagstaff Well & Supply, Inc.</u> | |
| John William Myers, III | 1983 – 2017 | Flagstaff, AZ |
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Preferred Pump's Tucson Open House

March 11, 2017



Preferred Pump's Tucson Open House

March 11, 2017



13 Rules to Live By

By John Fowler, CSP, AZWWA Safety Director; *National EWP* Safety Manager



When working in the well drilling and pump service industry, jobs can take you anywhere from a remote farmer's field to a large open pit mine or a nuclear power plant. The wide variety of locations means that not only do the hazards change from job to job, but the regulations as well. One day you are expected to comply with OSHA (Occupational Safety and Health Administration) regulations and the next with MSHA (Mine Safety and Health Administration) regulations. Luckily there is a significant amount of overlap because, at the end of the day, both OSHA and MSHA have the same goal: a workplace free from known hazards.

Both OSHA and MSHA analyze fatal accidents that happen in their respective industries in order to identify the root causes of the accidents. OSHA, for example, has identified four common hazards that account for the majority of their fatalities. They call them their "Fatal Four": Falls, Electrocutions, Struck by Objects and Caught In/Between. MSHA has followed the same categorization breakdown for surface metal/non-metal mines and has determined that there are 13 rules which, if they had been followed, would have prevented the majority of reported fatalities; they are the "13 Rules to Live By". Despite the difference in the industries regulated by OSHA and MSHA, the hazards they identified are similar and almost all are dealt with on a daily basis in the drilling and pump service industry. We know what OSHA's "Fatal Four" hazards are, but what are MSHA's "13 Rules to Live By" and how do they apply to what we do?

The first MSHA Rule to Live By is: Operating speeds of equipment. MSHA says, **"Operators of self-propelled mobile equipment shall maintain control of the equipment while it is in motion. Operating speeds shall be consistent with conditions of roadways, tracks, grades, clearance, visibility, and traffic, and the type of equipment used."** 30 CFR 56.9101. Whether driving on a muddy mine road or on an icy highway, we need to drive according to the conditions. Watch speed, following distances, and always drive defensively. The more severe the driving conditions, the slower you should drive and the more space you should leave between yourself and the vehicle in front of you. Driving to and from work, as well as on the jobsite, is typically the most hazardous activity we do all day. Because of this, an increasing number of commercial clients are asking that anyone driving on their property take a defensive driver course. There are a wide variety of Defensive Driver courses to choose from, but before making any decisions talk to your insurance carrier. Some commercial clients have their own courses and many will give you a discount upon completion of approved Defensive Driver courses.

The second Rule to Live By is: Working on power circuits. MSHA says, **"Power circuits shall be de-energized before work is done on such circuits unless hot-line tools are used. Suitable warning signs shall be posted by the individuals who are to do the work. Switches shall be locked out or other measures taken which shall prevent the power circuits from being energized without the knowledge of the individuals working on them. Such locks, signs, or preventative devices shall be removed only by the person who installed them or by authorized personnel."** 30 CFR 56.12017. This Rule to Live By is very similar to the second rule of OSHA's "Fatal Four" Hazards: Electrocution. Are we correctly locking out our equipment when we are working on it? Once we have identified what energy source needs to be isolated, we isolate that energy and then lock it out using a personal lock and tag. Remember to use a tag with your name and the reason why it is locked out. It is important to make sure that the key you use to lock it out is solely controlled by you, that key is your protection. The last step of Lockout is the "Try Out" step, which is often overlooked. After the equipment is locked out, try to start it and ensure the power circuits are no longer energized and any stored energy has been released. Only then, after the final step of LOTOTO is completed, is the equipment safe to work on.

The third Rule to Live By is: Brake performance. MSHA says, **"Self-propelled mobile equipment shall be equipped with a service brake system capable of stopping and holding the equipment with its typical load on the maximum grade it travels."** 30 CFR 56.14101(a). Brakes should be checked every day, regardless of whether we are working in a mine or preparing to drive down a highway in a commercial vehicle. When we inspect our brakes for the pre-shift or pre-operational equipment inspection, examine the service brake, park brake, low air alarms and general condition of the air system. And brake checks should not just be for heavy trucks, inspect the brakes on all equipment from your crew pickup to your backhoe to your forklift. Every year people are injured or killed when brakes malfunction and often if they had been inspected before operation the problem would have been obvious. One of the best systems for checking brakes is the 7 step brake check the steps of which are freely available online.

(Continued on page 9)

The fourth Rule to Live By is: Procedures during repairs or maintenance. MSHA says, **“Repairs or maintenance of machinery or equipment shall be performed only after the power is off, and the machinery or equipment blocked against hazardous motion. Machinery or equipment motion or activation is permitted to the extent that adjustments or testing cannot be performed without motion or activation, provided that persons are effectively protected from hazardous motion.”** 30 CFR 56.14105. This Rule to Live By is similar to the fourth rule of OSHA’s **“Fatal Four” Hazards: Caught In/Between**. When we are locking out a piece of equipment we need to think about all the potential sources of energy involved: electric, hydraulic, gravity, pneumatic, etc. It is common to think about only electrical hazards when we talk about LOTOTO, but what about other hazards? An unfortunate example of failing to identify all the potential sources of energy is an accident that happened a couple years ago in Australia. A mechanic and driller were working on a drill rig with the top drive in the raised position. The rig was locked out with both of their personal locks on the battery disconnect and the LOTO permit completed. The mechanic began to work on the hydraulic system and mistakenly disconnected the hydraulic hose supplying hydraulics to the top drive. This caused the top drive to fall severely injuring both the mechanic and the driller. The rig was locked out, but not all of the potential sources of energy were isolated. In this case the head could perhaps have been lowered all the way to the table or if it needed to be in the air some type of blocking or secondary securement could have been used. And if a guard is removed during equipment repair or maintenance take the time to re-install it before starting the equipment. The time you saved taking a shortcut will be quickly lost if someone is injured.

The fifth and sixth Rules to Live By are almost identical: Seatbelts shall be worn by equipment operators and seat belts shall be provided and worn in haul trucks. MSHA says, **“Seat belts shall be worn by the equipment operator”** 30 CFR 56.14130 and that **“Seat belts shall be provided and worn in haulage trucks.”** 30 CFR 56.14131(a). We should always wear our seatbelts. Period. End of story. Unfortunately, every year there continue to be cases where people die in car accidents because they were not wearing their seatbelts. In 2008 54% of those killed in crashes were not buckled up. On mine sites some operators wear their seatbelts only to be killed when they take them off in the hope that they can jump clear of rolling equipment. Mine sites require mobile equipment to have Roll-over Protective Structures (ROPS) and if a piece of equipment rolls it is almost always safer to stay inside. Operators often try to jump free of rolling equipment and then the piece of equipment lands on top of them or rolls over them, instead stay inside and wear your seatbelt at all times. This is a rule that not only applies to the worksite, but to everyday life.

The seventh Rule to Live By is: Machinery, equipment and tools used beyond design. MSHA says, **“Machinery, equipment, and tools shall not be used beyond the design capacity intended by the manufacturer where such use may create a hazard to persons.”** 30 CFR 56.1420. Know the limits of your tools and equipment and do not work beyond those limits. If a tool or piece of equipment has a built in safety factor it does not mean you can take the safety factor into account when determining capacity. If the manufacturer says that specific tool or piece of equipment is rated for X amount then that is all it is rated for. If you need more capacity get a bigger tool or piece of equipment.

The eighth Rule to Live By is: Parking procedures for unattended equipment. MSHA says, **“Mobile equipment shall not be left unattended unless the controls are placed in the park position and the parking brake, if provided, is set. When parked on a grade, the wheels or tracks of mobile equipment shall be either chocked or turned into a bank.”** 30 CFR 56.14207. This is very mine specific, but think when you park a vehicle or equipment. Often we are driving large equipment with large blind spots so take the extra time to park in an area with sufficient room. Don’t try to squeeze a large truck into a tight spot in a crowded parking lot.

The ninth Rule to Live By is: Safety belts and lines. MSHA says, **“Safety belts and lines shall be worn when persons work where there is danger of falling; a second person shall tend the lifeline when bins, tanks, or other dangerous areas are entered.”** 30 CFR 56.15005. This Rule to Live By is similar to the first rule of OSHA’s **“Fatal Four” Hazards: Falls**. MSHA says fall protection or prevention is to be used at any height when “there is danger of falling.” Use common sense, and look at not just the height you are working at, but any surrounding obstacles you could fall on or in. If you are asking yourself the question of whether or not you need some form of fall protection, you most likely do.

The tenth Rule to Live By is: Bins, hoppers, silos, tanks and surge piles. MSHA says, **“Where persons are required to enter any facility listed in this standard for maintenance or inspection purposes, ladders, platforms, or staging shall be provided. No person shall enter the facility until the supply and discharge of materials have ceased and the supply and**

discharge equipment is locked out. Persons entering the facility shall wear a safety belt or harness equipped with a lifeline suitably fastened. A second person, similarly equipped, shall be stationed near where the lifeline is fastened and shall constantly adjust it or keep it tight as needed, with minimum slack.” 30 CFR 56.16002. Although we don’t often work in bins, hoppers, etc. we need to be aware of our surroundings and make sure that all equipment is properly locked out. As well as make sure you have been trained in how to safely work in a Confined Space.

The eleventh Rule to Live By is: Suspended loads. MSHA 30 CFR 56.16009 says, **“Persons shall stay clear of suspended loads.”** This Rule to Live By is similar to the third rule of OSHA’s **“Fatal Four” Hazards: Struck By.** Stay out of the line of fire. It is important for you to make sure you are in a safe area, but also to watch out for the other members of your crew. We work around suspended loads on almost every shift. A good practice for keeping you and your entire crew safe is to make sure that overhead shackles are positively secured so that vibration won’t cause the shackle pin to back out. Another best practice tip is to make sure everything attached to the rig has a cable attached as a back up if the primary mount fails. When working keep an eye on what is going on above you.

The twelfth Rule to Live By is: Barricades and warning signs. MSHA says, **“Areas where health or safety hazards exist that are not immediately obvious to employees shall be barricaded, or warning signs shall be posted at all approaches. Warning signs shall be readily visible, legible, and display the nature of the hazard and any protective action required.”** 30 CFR 56.20011.h Our drill sites contain many hazards and it is critical that we communicate these hazards to visitors as well as each other. Don’t assume that visitors or even new employees understand what areas to avoid.

The thirteenth and last Rule to Live By is: 57.3360 Ground support use. This standard applies to underground scaling and does not have much to do with the work we perform except for this: We need to always be aware of our surroundings and do a work place inspection.

The hazards identified in the 13 “Rules to Live By” contributed to the 589 deaths in the mining industry between 2000 and 2008. Between 2012 and 2016, 101 miners in metal/non-metal were killed on the job. The yearly number has been dropping, but people are waking up, going to work, and never coming home because of a lack of education regarding workplace safety. Even if you don’t work on a mine site think about the 13 “Rules to Live By” and how they can be applied to what you do.

Feel free to contact John with any questions, comments or suggestions:

John Fowler, CSP - Safety Manager



PH: 480.558.3500 PH; Cell: 480.352.2041; Email: jfowler@nationalewp.com

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In Memoriam



Edward Elbrock, of Animas, NM, entered eternal rest on Thursday October 27, 2016 in Tucson, Arizona following an ATV accident on his ranch. Services were held Monday November 7, 2016 at the Animas High School Gymnasium.

Edward was born on February 13, 1940 in Lordsburg, New Mexico to Lewis and Retha Elbrock. His #1 profession was being a rancher. He was also a local businessman owning Elbrock Water Systems, Elbrock Drilling, Valley Mercantile and Valley Fuel Center.

Edward is survived by his wife, Tricia Elbrock, daughter, Starla Freeman, sons, Bunch Swift, Travis Swift, and Trevor Espinosa. Grandchildren are Lewis and Shauna Espinosa, Tell Swift, Jayden, Kylie, Luke, and Jaxen Espinosa. Brother, Billy Ray Elbrock (Josephine) and sister Patsy Ann Malm and many nieces and nephews. Edward was preceded in death by his parents, Lewis and Retha Elbrock and son, Sheldon Elbrock.

Edward offered much needed well, septic, and equipment services to Hidalgo County, all Southwest New Mexico, and Southeast Arizona for more than 40 years. He also made a trip to Tanzania to teach the Maasai people how to repair their earthen dams; to teach them conservation techniques. Edward was presently serving as president of the Columbus Electric Coop Board where he has served for 38 years. He also served on the Malpai Borderlands Group, Animas School Board for 14 years, Farm Services Agency Committee for 26 years, served on Hidalgo County Fair Board, member of the Hidalgo County Cattle Growers and member of the National and New Mexico Groundwater Associations. He also served under President George W. Bush on the Environmental Good Neighbor Board that addressed environmental problems along the Southern border.

Pallbearers will be Booster O'Byrne, Crowbar O'Byrne, John Pat O'Byrne, Ernie Fralie, Jack Blandford, and Cash Massey. Honorary bearers are Dean Janzen, John O'Byrne, Wayne Fralie, Clyde Yarbrough, Randy Massey, Ricky Massey, W.H. Adams, Billy Darnell, Ladd Walker, Lanny Hargrove, Jay Peterson, Kelly Peterson, Janice Blandford, Reece Woodling, Ed Roos, Billy Elbrock, Bunch Swift, Travis Swift, Trevor Espinosa, Tell Swift, Lewis Espinosa, Ruthie Chadborn, Victor Armbruster, Polie Urrea, Ramon Nieblas, Eduwiges Mendoza, Ken Moore, Dustin Moore, Victor Renteria Parra, Buddy Burns, Audie Freeman, Sharla Hernandez, and Antonio Rico.

In lieu of flowers family requested that memorial contributions be made to the Cotton City 4H Club or the Animas FFA Chapter.

WE HAVE MOVED !!

We have outgrown our facility and our new location is:

Mitchell Lewis and Staver
2155 S. 75th Ave. #100
Phoenix, AZ 85043

Our phone and fax numbers remain the same.

In Memoriam



JACKSON, Robert L. "Bob" 9/10/1945 - 2/8/2017 Bob Jackson was born in Wick- enburg, AZ to Leonard (Rusty) and Frances (Billie) Jackson. The family spent time working and traveling most of Arizona where he developed a strong connection to the natural beauty of the mountains, deserts, plants and animals. It was no sur- prise that after graduation from Mayer, AZ high school at the age of 16, Bob went to work on a drill rig. His work for different drilling companies, including Anaconda Mining, took him to several states and countries including Montana, Alaska, Cana- da, Mexico, Chile and Peru.

By 1973 Bob decided to start his own business and thus began B J DRILLING COMPANY, INC. in Benson, AZ. He included his family in his business plan. When Arizona started to realize the water of our state needed protection, Bob helped develop some of the regulations for the Arizona Department of Water Resources. Water well drillers needed a license and Bob was proud to hold driller license Number 25 till his last day. He was determined to continue drilling and did so while he taught many others in the industry. His kindness, knowledge, and expertise will be missed by many, but Bob put a plan in place for the company to continue indefinitely.

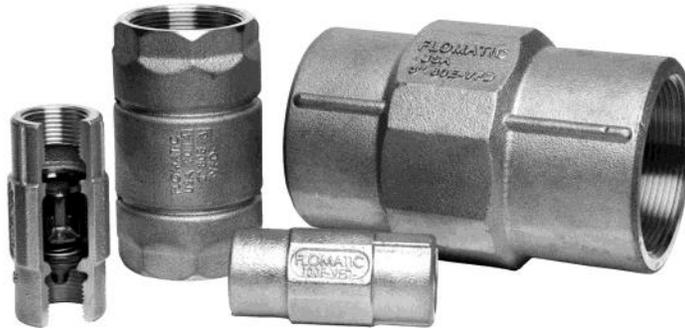
He is survived by his wife, Norma; mother-in-law, Luzetta Malene; daughters, Rebecca Jackson and Cathy Cloin; son, Thayer (TC) Jackson; stepdaughter, Tammy Kastre; six grandchildren and seven great-grandchildren. Ser- vices were held February 18, 2017 at Evergreen Mortuary in Tucson, with burial following at the Evergreen Ceme- tery. In lieu of flowers, the family suggested that memorial contributions may be made to the Humane Society of Southern Arizona, 3450 N. Kelvin Blvd., Tucson 85716.



Bob Jackson, 3rd from Left – One of the Founding members of AZWWA

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History of Arizona Drilling Licenses

By Mike Ball, ADWR

With one exception, the first 151 drilling licenses were issued on or about June 12, 1980 (the date the Groundwater Management Act became law and the day ADWR became a State agency). Those licenses were issued to any contractor who had previously been issued a C-53 Residential Water Well license by the Registrar of Contractors (ROC). In 1980, the ROC only regulated residential contractors. It wasn't until sometime in the late 80's before commercial contracting returned. For the first year or so, each of those 150 firms (and the qualifying parties that represented them) were simply allowed to drill using what was essentially a "temporary" drillers license.

Sometime around June 1981, the Department sent out applications for full-time well driller licenses to each of these "so-called" drilling firms. Turns out, there were a number of C-53 license holders who had no interest in the drilling of wells (or installing pumps). For the rest of them, including Bob Jackson, they filed their applications. While the date that the Arizona Administrative Code (AAC) or rules that covered the minimum well construct standards and the licensing of well drillers didn't go into effect until March 4, 1984, drillers were already completing the National Water Well Associations (NWWA) trade examination so that they could complete the licensing requirements before the June 12, 1984 requirement. The first eleven drilling firms that were issued temporary licenses back in 1980 were made up of those individuals who actively sat on the board that wrote Article 8. Well Construction and Licensing of Well Drillers. The following 140 licenses were assigned alphabetically. While Bob Jackson had early license number #25, B-J Drilling Company simply fell between Blakeman Drilling and Eddie P. Boone Drilling (not exactly alphabetical). After Yuma Pump & Drilling (#151), things fell into place based on when you filed your application.

There was another problem that was created back in the mid 1980's. Someone decided to issue Single-Well Drillers Licenses (SWL) using the same numbering sequence. After I was hired in December of 1986, I realized what a mess this was turning into and created a separate licensing sequence for SWL. At some point, I filled in those now empty numbers with full-time licenses (FTL). As of today, there have been 860 full-time well drilling firms issued licenses with at least 1000 individuals spread out amongst those firms. If you look at Layne Christensen Co. formerly known as Layne-Western (ADWR License No. 7), there have been 19 Qualifying Party's assigned to that license alone. By the way, the list cannot be found online until I get it cleaned up. The last time I released this list was on 9/10/2010 and quite a few changes have to be made. On the Department's website, one can find a list of active drilling firms under the heading WELLS. Cursor down and you will surely find it. You will then see that license #4 (Odom's, Inc. - Ray Parker), #6 Jim Williams Well Drilling (Jimmy Williams), #7 Layne Christensen Co. (Scott Graham & Cody Myers), #10 Shelton's Well Service (Gene Shelton), #12 A to Z Drilling & Pump (Terrance McCray), #13 Allen Pump Co. (Steve Allen) and #14 Allen's Well Service (Harvey Allen) are still active. The rest have been laid to rest.

Arizona, Mexico Making Progress On New Colorado River Treaty

By Will Stone

Arizona's top water official says a new Colorado River agreement with Mexico could be close.

The bi-national negotiations are aimed at renewing an existing treaty called Minute 319, which is set to expire at the end of 2017. That outlines how the two countries divvy up the Colorado River and what happens in the case of a shortage. It also lets Mexico store water in Lake Mead and set aside some to revitalize dry portions of the river. Negotiators from both countries and Southwest states have been trying to get a deal done before the new Administration takes over.

Tom Buschatzke, head of the Arizona Department of Water Resources, said recently they're making progress. "We think there is a very good deal on the table, a lot of benefits for Arizona, a lot of benefits for Mexico, and we are working to finalize that as quickly as possible," Buschatzke said.

Buschatzke said the treaty could include desalination projects for the two countries.



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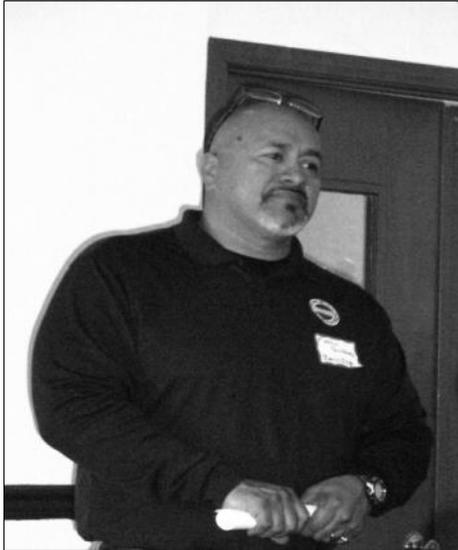
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**AZWWA 1st Quarter Membership Meeting
January 21, 2017
Coco's Restaurant, Phoenix, AZ**



Speaker Martin Quinones with Baroid IDP

We had a very good meeting in January with a variety of members participating. Our Guest Speaker, Martin Quinones from Baroid, gave a great presentation on drilling fluids used in various applications around Arizona and other regions our members mentioned which resulted in several interesting and informative discussions. These discussions included attending drilling/pump contractors, technical and supplier members so situations and dialogues were quite varied. Danny Oaks with Baroid was also in attendance and contributed to the discussions. Our business meeting included input on a variety of items which included Drilling & Pump Licensing, upcoming new Rules & Regs, changes at ADWR, happenings around AZ, Scholarships, etc.

Our Spring Membership Meeting will be held April 15th, at Coco's Restaurant on 7th Street in Phoenix. Our Summer Meeting/Annual Picnic will be June 16th & 17th at Goldwater Lake in Prescott. **MARK YOUR CALENDARS!**

We look forward to seeing you there!!!!

Phoenix, Gila River Indian Community May Work Together To Store Groundwater

By Carrie Jung

The city of Phoenix and the Gila River Indian Community could soon be working together to store groundwater.

The city approved an agreement in principal. The Gila River Indian Community Tribal Council says they plan to take formal action on the move in the near future.

Officials with the city say under the first phase of the proposed partnership, Phoenix will store up 3800 acre feet of Colorado river water in the Gila River Indian Community's Olberg Dam Underground Storage Facility.

That facility was originally created to recharge the community's aquifer and restore flows to the Gila River, a waterway the community considers sacred. The agreement is part of a small-scale pilot project that could lead to larger and long-term programs.

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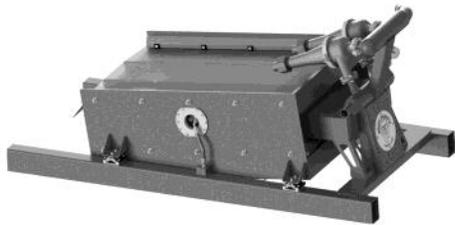
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In Memoriam

Historian Jack August,
Author of Books on Pivotal Issues in Arizona History, Passed at age 63

Portions reprinted from azcentral.com, the Republic and Daily Courier; Photo on Left: Special forThe Republic



Photo on Right: Gary Hix (AZWWA President) presenting Jack with an Arizona Water Well engraved glass cup as a "Thank You" for Speaking at AZWWA's July 2012 Meeting in Prescott

Jack August died January 20th at a Phoenix hospital from liver failure after falling ill 10 days before. Among being nominated for the Pulitzer Prize in history, Jack authored several books including one about Prescott, "We call it Preskitt."

In 2016, Jack was named historian and director of Institutional Advancement at the Arizona Capitol Museum in the State Library. Those are units of the Secretary of State's Office. Dr. Jack was a tremendous person and amazing historian," Secretary of State Michele Reagan said in a statement. "I was honored he agreed to help us get the Arizona Capitol Museum going in the right direction, and I consider myself lucky to count him as a friend. Jack's skills, stories and incredible mind will be greatly missed around the state, but his legacy in Arizona will endure for generations to come."

In addition to joining the Secretary of State's staff, August was a visiting scholar in legal history at the law firm of Snell and Wilmer. An expert on water resources in Arizona, Dr. August served as an expert witness and consultant for cities, utilities and private companies in relations to water rights and water delivery systems throughout the state.

Jack authored 10 books, many of which focused on Arizona history, including a biography of former Gov. Raul Castro and U.S. Sen. Carl Hayden. He was working on a biography of Fyfe Symington, a friend of Jack's for many years, when he passed. "He was such a great guy, such a rangy and humorous guy." Symington said. He and August had recently had a two-hour session as work continued on the biography, which remains unfinished.

Jack was a former executive director at the Arizona Historical Foundation at ASU, a Fulbright scholar and a National Endowment for the Humanities research fellow. He also held a bachelor's degree from Yale University, a master's degree from the University of Arizona and a Ph.D. from the University of New Mexico.

Phoenix Mayor Greg Stanton was friends with August for more than two decades. He said he was heartbroken by the news. "He loved this state with a passion and was truly the people's historian," Stanton said in a statement. "His meticulous research and gift for story-telling brought our state's history to life in ways that have helped us better prepare for our future. Jack is gone far too soon, but like any great historian, his gift to us will benefit many generations to come."

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Record Pinal County Fissure Shows Arizona is Still Prone to Shifting Earth Levels

By Tony Davis Arizona Daily Star



Photo by Mamta Papat, Arizona Daily Star; Geologist Joseph Cook takes a photo of a portion of the earth fissure discovered on Arizona state trust land south of Eloy.

At first, the ground crack is a few inches wide, as it cuts south from a dirt road through mesquite-and-creosote flats about a dozen miles south of Eloy. Slowly, it opens up, at times wide enough to swallow a quad vehicle and deep enough that you can't see bottom. Back and forth, the fissure narrows then widens, grows deeper then shallower, until petering out nearly two miles later. "This is the longest single fissure ever discovered in Arizona," geologist Joe Cook said recently as he walked along it. Up to 10 feet wide and 27 feet deep, "it's deep enough that you wouldn't want to fall in."

It is also Arizona's newest physical evidence of the impacts of chronic over-pumping. The groundwater pumping leads to subsidence, the geologic phenomenon of ground settlement that triggers fissures. It's a persistent and worsening problem in some rural areas, even as other areas have replaced groundwater with Colorado River water.

Lying about halfway between Tucson and Phoenix, west of Picacho Peak and north of Ironwood Forest National Monument, this fissure was discovered in two parts. The northern half appeared in December 2014 in Google Earth satellite images. The southern half, which hasn't shown up on Google yet, was discovered Jan. 12 by Cook, manager of the Arizona Geological Survey's fissure mapping program.

It's one of hundreds if not thousands of earth fissures across the state. First discovered in the Picacho-Eloy area in 1927, Arizona's fissures total about 170 miles today and are increasing in number yearly. About 70 miles of fissures have opened in this area alone, the state water agency said in a new report.

While no humans have fallen in, at least in Arizona, fissures are a known hazard to animals, having swallowed a 1,500-pound horse and a number of cattle over the years. Across the state, the cracks have undermined roads, homes, power lines, sewer lines, irrigation canals and one section of Central Arizona Project aqueduct. They can be conduits for contaminants traveling to the aquifer, and sometimes become dumping grounds for people's unwanted pharmaceuticals, tires, garbage and even refrigerators. "I think it's a little shocking that we're causing these huge cracks to form in the landscape," Cook said. "Isn't it a rude awakening — a wake-up call?"

Fissure creation could speed up if and when Lake Mead drops low enough to trigger a Colorado River shortage that curtails CAP deliveries to farmers, said Cook, state water officials and Brian Betcher, general manager of a Pinal County irrigation district. Then, farmers could step up their groundwater pumping, triggering more subsidence.

For now, this giant crack aside, the state's most active fissuring is in the Willcox groundwater basin in Cochise County, said state officials. There, unregulated groundwater pumping has increased in recent years as more farmers have moved in and sunk new wells. Forty-two miles of earth fissures are known in the Willcox area. Nearly 20 miles have opened up in the neighboring San Simon-Bowie area. In both the Willcox and the Eloy-Picacho areas, said geologist Cook, "every time I look at Google Earth, I see another fissure."

DAMAGES ADD UP

Subsidence and fissuring are problems across the arid West. In the 1970s, fissures undermined home foundations in North Las Vegas, causing \$14 million in damage. In California, a new NASA study shows that subsidence from over-pumping in the drought-stricken Central Valley has caused a 2-foot drop in sections of the California Aqueduct, limiting its ability to deliver water to 25 million people and nearly a million acres of farmland.

In Arizona in July 2007, a fissure opened and swallowed a horse, after a thunderstorm dropped 2 inches of rain in an hour and eroded ground at the Maricopa-Pinal County border. Known as the "Y-Crack," the fissure had opened and been backfilled several times before. This time, water undermined the backfill, leaving a hole 40 feet deep and 15 feet wide. A 13-year-old horse named Cash fell in and died despite 15 hours of rescue efforts.

In the late 1990s, workers discovered a section of CAP canal in Scottsdale was sinking because of land subsidence. Project

(Continued on page 23)

officials spent \$350,000 fixing the problem. And in September 1992, more than \$3 million in damage occurred at Luke Air Force Base west of Phoenix when subsidence caused the slope of a drainage facility to reverse, sending floodwaters to the base.

A 9-mile-long discontinuous earth fissure in the Picacho-Eloy area crossing Interstate 10 has repeatedly damaged the freeway and required repairs. In the Phoenix area, authorities had to spend \$200,000 to prevent damage from a fissure crossing the Red Mountain Freeway during its construction. In agricultural areas of Pinal and Cochise counties, the fissures aren't as big a threat because few people live nearby, officials say.

But in the Willcox area, two major intersections are regularly broken up by fissures: at Dragoon and Kansas Settlement roads and at Kansas Settlement and Parker Ranch roads. At Dragoon and Kansas Settlement roads, "the county consistently backfills it and puts up warning signs," said Murray McClelland, a longtime area resident and former president of the Pearce-Sunsites Chamber of Commerce. That fissure has also ruptured a nearby high-pressure natural-gas line. An earth fissure also lies underneath fly ash ponds at the Apache Generating Station near Cochise southeast of Benson, the state water agency said.

As Cook walked along the newest Pinal County fissure, he recalled pulling a calf out of one near Elfrida in Cochise County a few years ago. "I was mapping a fissure and I saw a big white triangular thing down there — a cow's face, only a few feet deep. It was stuck in the mud," Cook said. "Me and another guy had to lever it out, seesawing it back and forth." Pointing to the new fissure, he added, "If a cow is in this thing, I'm sorry, cow. I'm not going to get you out."

OLD PUMPING, NEW CRACKS

Fissures can exist for years or decades underground before they're even seen. Often, they open only after monsoon storm waters erode the ground and seep into existing cracks. Many fissures that could form above ground in the future probably exist today, undetected. For the root cause, scientists blame "differential subsidence," when adjoining sections of land decline at different rates as groundwater is pumped.

In Arizona, where groundwater over-pumping was rampant until the CAP arrived, more than 3,400 square miles have subsided in at least 26 separate areas, said the new Arizona Department of Water Resources report. Only one known fissure has formed in Pima County — in the Avra Valley in 1981. Since then, subsidence from groundwater pumping has declined here because of the retirement of farms and arrival of the CAP. But in the Eloy-Picacho area north of where the big fissure opened, land has dropped up to 19 feet since the 1940s. An area about 15 miles north of the new fissure sank 15.5 feet just from 1954 to 1985. No one can say whether the new fissure was triggered by old or recent pumping. Since CAP water arrived in 1986, Pinal farmers' groundwater pumping has dropped two-thirds, but it started rising again in this decade.

The subsidence that caused this crack "was likely caused by the collective impacts of groundwater withdrawals over several decades," the state water agency said. Brian Betcher, general manager of the Maricopa-Stanfield Irrigation District north of Eloy, said he suspects the cause is historic pumping because despite recent increases in groundwater use, "we're not even near those levels of pumping in the 1960s and '70s."

SOLUTIONS ARE ELUSIVE

As Cook walked along the new fissure, he recalled that when its northern end was discovered in 2014, it was deeper and wider than now. Much of it has filled in with sediment dumped by big storms. That's happened to many other fissures and will eventually happen to this fissure's southern end, he said.

But longer-term solutions to fissuring are more elusive. The Arizona Department of Water Resources has held five planning meetings on water in the Willcox area since March 2016. There's been "zero" progress, said former chamber president McClelland. While some farmers there are willing to self-regulate their pumping, other landowners including ranchers see that as a violation of property rights. Another meeting will be held by this spring.

In Pinal County, efforts to arrest groundwater pumping are hampered because the 1980 Groundwater Management Act, while "terrific up to a point, doesn't really give the department the tools it needs to stop the overdraft completely," said Kathleen Ferris, former director of the state commission that drafted that law.

For example, the state water agency has the right to impose a pump tax on farmers to raise money to buy and retire farmland, said Ferris, who ran the department in the 1980s. But the tax is limited to \$2 an acre-foot, "and we've known from the beginning that it wouldn't generate enough money to buy much ag land and put it out of production," she said.

In Las Vegas, authorities were able to halt subsidence and fissuring by replenishing the aquifer with water from neighboring Lake Mead. But recharging won't restore previous aquifer conditions or prevent future fissures in Pinal County, said state water agency spokeswoman Michelle Moreno.

A great deal of the subsidence in the Pinal area stems from compaction of fine-grained sediments that lost water. Such subsidence, she said, "is permanent and irreversible."



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In Memoriam



Harriett Faith Odom was born Harriett Faith Brawner on November 4, 1926 to Frances Odel McKee Brawner and William Goebel Brawner. She grew up in what was then considered "rural" Phoenix at 27th Avenue and Lower Buckeye Rd. She attended Murphy School and Phoenix Union High School with her sisters Frances Catherine and Elizabeth "Betty". After high school Harriett moved to California with her sister Frances and brother-in-law George, and worked at North Island Naval Air Station, followed by Alameda Naval Station. She returned to Phoenix to work at Luke Air Force Base and met the love of her life, Jesse "Jess" Odom.

Harriett and Jess married December 23, 1949 and moved to Silver Bell, AZ until the birth of their son Gary in 1957. They then moved to the Buckeye Valley where they entered into the drilling business which became a very large part of their lives. Jess held ADWR License No. 4 and both he and Harriett were very active in the early years of the Arizona Water Well Association. They retired from the drilling business in 1989 and purchased a second home in Pinetop where they would spend their summers when not traveling in their motor home with friends.

Harriett was very active in the P.E.O. Sisterhood early on and was honored to have served in P.E.O. Chapter "A", which was founded by her grandmother in the home where Harriett was born and would later live with Jess.

Harriett passed peacefully at home on March 9, 2017, comforted in the love of her nieces and nephews, along with the team of caregivers that loved her like family. She was preceded in death by her husband Jess, son Gary and her two sisters Frances and Betty. Harriett loved her family, her friends, and especially Jess to whom she was so devoted for 67 years.

Memorial services were held March 17th at the Church of Jesus Christ of Latter-day Saints at 25800 W Southern Ave, followed by interment at Greenwood Memory Lawn Cemetery in Phoenix.

She was a wonderful lady and will be missed by many.

In Memoriam



Photo by World Wide Drilling Resource;

Portions of article reprinted from WWDR and Comments from Mike Ball, ADWR

Howard "Porky" Cutter - "Porky" passed away January 15, 2017 at his home in Virginia Beach, Virginia after a battle with cancer. He was 80 years old. Many of us visited with Porky at trade shows or other events and/or read his articles in various trade magazines. He was a Master Ground Water Consultant (MGWC) with the NGWA (the guys in the green jackets). He was very proud of what those green jackets represented and held membership #4 in Master Certification with the NGWA in 1983.

Mike Ball (ADWR) reports that he met Porky back in the late 1980's when Mike used to attend the NGWA National Conventions. On January 16, 2001, Mike issued Arizona Well Driller's License Number 687 to Porky. The firm name listed on the license was Drilling Consultants International, Inc. As a Certified Master Well Driller, Porky's license listed every drilling and pump installation trade exam that has ever been offered by the NGWA. Porky's Arizona Well Drillers License was still active at the time of his death.

Porky leaves behind his wife, Bessie (Bess), two sons, Randall (Randy) Eugene Cutter and Chris Evans "Piglet" Cutter. He was preceded in death by his parents and infant daughter, Cindy Lynn Cutter. A memorial service was held in his honor at the Unity of Tidewater Church in Virginia Beach, VA.

He was a true icon of our industry. His knowledge, contributions and many stories will be greatly missed by many.



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Ode to Groundwater

What is groundwater,
and where is it found?
Why it's water beneath,
our feet – underground.

Through soil, sand, and rock,
under the ground it moves.
Its home is called an aquifer,
with many fractures and grooves.

The aquifer is recharged
with rain and melted snow.
Depending on the type of soil,
it can happen fast or slow.

Groundwater comes to the surface,
on its own or through a pipe.
Naturally through springs, lakes, or streams,
or by drilling a well of some type.

The aquifer is very important,
and must be protected from above.
For pollutants can sink below the surface,
and destroy this water we love.

More than 50 percent of the United States,
requires groundwater each day.
We drink it and irrigate our crops,
it is a vital resource in every way.

So now the story has been told
and you know what you must do.
Please help protect our groundwater
for its future lies with you!

Reprinted from Parks Water Resources website

www.parkswaterresources.com/Well-Inspection.html



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Arizona Water Well Association Scholarship Criteria



The **AZWWA** offers educational scholarships in the amount of \$1,000 per semester for the children and/or grandchildren of contractors who have been members of our Association for a minimum of 2 years or employees of said contractor who has a reasonable relationship with the Association.

Other qualifications of the applicant are:

- Has the support of his/her family. If the applicant is a child or grandchild of an employee of a contractor, the owner/manager must also support the applicant.
- Acceptance by aforementioned Arizona institution. The Committee will take into consideration any requests or attendance at schools outside of Arizona.
- Full time enrollment. The Committee will take into consideration requests for less than a full schedule.
- Maintain a 2.5 grade point average.

The above qualifications are in reference to university or junior college enrollment. However, the Committee will consider requests for trade school or other participation at reduced levels of financial support if such education is deemed beneficial to the family's business effort.

A completed Scholarship Application, including a resume, a letter of endorsement from the applicant's parents or employer and a transcript from the last educational institution attended is required.

The sum will be paid upon applicant's submittal of proof of registration at an Arizona institution.

For more information or questions, please contact our current Scholarship Chair or the AZWWA office. To request a Scholarship Application, please contact the AZWWA Administrative office directly.

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Pathways to Water Resources Sustainability

(Recommendations for sustainable groundwater management in Arizona)

Reprinted from The Daily Courier; by Wayne Hood, R.G., Special to the Courier. Prescott, AZ

Limited water resources and our dry climate in the American Southwest challenge us to apply new approaches along with traditional strategies to meet both human and environmental water demands. Such water management methods incorporating the interdependence of society and the natural environment are slowly emerging through scientific, legal, economic, social and political pathways. Will such practices be adopted and effective to ensure that future water security in our region is comprehensive and resilient?

The Arizona Groundwater Management Act of 1980, the centerpiece of the state's water management framework, established the groundwater management goal: to achieve and maintain "safe-yield" by the year 2025 within Active Management Areas (AMAs), such as the Prescott AMA (PrAMA). The state's AMAs are located in agricultural and population centers where groundwater usage is greatest.

The GMA generally defines safe-yield as the long-term balance between annual groundwater withdrawals and natural and artificial recharge to aquifers. Unfortunately, natural recharge rates in the PrAMA average only about 1 to 3 percent of annual precipitation amounts. Hence, groundwater mining has been occurring for many years within the PrAMA due to much larger groundwater withdrawals.

The safe-yield goal is not a regulatory mandate. Although PrAMA aquifers contain roughly 3 million acre-feet (one acre-foot is 325,851 gallons) of recoverable water, there are severe consequences for noncompliance with safe-yield by 2025 and beyond. Conceivable outcomes include continued falling water levels in many wells, costly public and private well deepening into lower water-quality zones, increased pumping costs, Verde River discharge declines, and potential land subsidence accompanied by earth fissures that can damage property and infrastructure.

It may surprise you that some Arizona water specialists predict the PrAMA, or any AMA, will not achieve safe-yield by the year 2025. In fact, projections of PrAMA overdraft in 2025 exceed 20,000 acre-feet per year. Despite the state's good intentions to manage our finite shared groundwater resources through the GMA, there are some scientific and statutory shortcomings and flawed assumptions.

A common misunderstanding is that the exploitation of an aquifer is "safe" if safe-yield is attained. In reality, the safe-yield concept is widely recognized to be an oversimplification of groundwater withdrawals and responses within aquifer systems. For example, the safe-yield goal does not require that regional water tables be maintained at levels that provide natural outflows to springs and streams (Del Rio Springs is predicted to go dry by 2025).

Nonetheless, many believe that the collective provisions of the GMA gradually bring us closer to more sustainable, longer-term water management due to its regulation of groundwater withdrawals and efforts to understand the dynamic nature of aquifers and water budgets. Despite its limitations, the GMA is essentially aligned with sustainability approaches that foster an inclusive and long-term view of water supplies.

Three recommendations that will move us more rapidly to safe-yield and closer to sustainable water resources are:

1. Arizona's political and community leaders must find the means to manage water resources more collaboratively to craft innovative and integrated solutions across economic, social and ecosystem needs. In our region this may materialize as "PrAMA Safe-yield Plans" with longer-term goals to address water scarcity and climatic patterns, augmentation of water supplies, and measures to protect the Verde River.
2. Obsolete water laws must be modernized to allow conjunctive management of groundwater and surface waters. The safe-yield goal must address existing gaps, such as surface water impacts and increased protection of aquifers outside AMA boundaries. Also, aquifer replenishment must be expanded with hydrologically-sound artificial recharge and recovery locations to better balance aquifer storage and water levels basin-wide. Legislatively, these and other changes may be feasible through amendments and addendums to the GMA.

Policies and ordinances must be authorized to enhance irrigation efficiencies and water conservation (including rainwater harvesting); to promote the use of effluent and other reclaimed supplies through advanced technology (including direct potable reuse); and to improve evaluations of private domestic well (exempt wells) and industrial groundwater pumping impacts.

Simply, but not so simple, local and regional water management strategies need to be better coordinated, evaluated, broadened, and adaptable. The business, environment and regulatory communities must work together on this. If we don't progress, we go backward – as stated in the GMA, "...the basic economy and welfare of this state and its citizens depend on a secure water future."

Wayne Hood, R.G., is a hydrologist and Citizens Water Advocacy Group board member.



Arizona Water Well Association
950 E. Baseline Rd. #104-1025
Tempe, AZ 85283

Events Calendar

April 15, 2017

**AzWWA Membership Meeting
Coco's Restaurant
2026 N. 7th St., Phoenix
8:30am—Meet & Greet; Speaker at 9:00am**

June 16 & 17, 2017

**AzWWA Golf Tournament, Picnic and Chili-Cook Off
Prescott, AZ**

October, 2017

**AzWWA Membership Meeting
Exact date and Location TBD**

December 5-7, 2017

**National Ground Water Convention
Nashville, TN For more information go to
<http://groundwaterweek.com/>**

February 8 & 9, 2018

**Mountain State Ground Water Expo
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