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WRD RETIREES

NEWSLETTER 168
 August 2015

An organization of retirees of the Water Resources Discipline, U.S. Geological Survey, whose purpose is to keep its members in touch with each other and their former agency.

PRESIDENT'S MESSAGE

You may recall that we conducted a poll of the members in the May newsletter, to learn opinions about the name of the organization, plus the content and arrangement of the newsletter. A modest number of replies were received, and here are the results as of this date:

The clearest consensus was on changing the name of the organization. The favored choice is *USGS Retirees Association*, which would encompass other disciplines represented within USGS, such as geology, cartography, biology, and administration. As you might expect, nothing will happen quickly, since we will take the time to consider how this might be implemented. In passing, I will note that our 2016 Nashville reunion is now being organized as the "USGS Retirees" so perhaps that is a first step.

The content and arrangement of the newsletter elicited few votes, but it seems prudent to lean toward a more conservative interpretation, to account for those members who have not voted. It seems that members would prefer that News of Retirees should be emphasized in the newsletter, perhaps with those articles contributed by members as a lead. There was less interest in seeing science articles on water resources, since members could carry out their own inquiries should they choose to do so. These results are implemented in this issue of the newsletter. What do you think of it?

You may have noticed that we have few affiliates listed in the telephone directory. In an attempt to recruit new blood, we have sent 400 copies of the WRD Retirees enrollment form to the USGS office in Norcross, Georgia. This handout will be used at the meeting of the 2015 Regional Water Data Conference in Jacksonville, Florida, during September 14-17, 2015. The idea is to recruit members who are current employees, and they can carry their membership into retirement later on.

I hope you like some of these ideas for the evolution of WRD Retirees. I continue to believe that it is our turn to pass on the torch to those who will serve the USGS in the future. As always, please send in any comments you may have.



Contents of Newsletter Supplement

American Water Resources Association Newsletter
 Cognitive Biases and Other Human Challenges of Complex Systems Science, by Pierre D. Glynn
 Humor: Hold-a-Meeting

WRD's Love Affair with Email by Doug Posson

There are certain firsts in a person's life that are memorable. Remember the first kiss, the first job, the first car, the first name on an authored report? Do you remember your first Email? I do.

Seriously, long before the Internet or World Wide Web (WWW) were invented, long before personal computers or workstations arrived, long before Google or Yahoo or AltaVista or AOL or Lotus 1-2-3, there was the Water Resources Division's (WRD) national network of Prime minicomputers. With the first Prime's being delivered and installed in September 1982 came the X.25 network that allowed any WRD user on any Prime terminal to communicate with any and all other WRD employees on what became GEONET and later DOINET.

Of course very few knew how to do this, or even wanted to. Some in WRD and Geologic Division may remember sending emails via the Multics Mail feature of the computers operated by the U. S. Geological Survey's Computer Center Division (CCD). There was no computer network, so there was no computer networking. Thus, one had to use a telephone and modem to access Multics. Each user had an email address, which was also their login identification (ID). I think it was limited to six characters and used your last name, so my address might have been "posson". Jesse McNellis' address was "mcmc". Why? Perhaps his whole last name didn't fit in six characters. Or because "mcmc" was the moniker he used when the Harris S125 computers in the Kansas and New Mexico Districts and Reston Research were the first "networked" minicomputers in WRD. Things were pretty flexible at the start. I had used "doug" as my Harris ID but CCD had rules about using a last name, sort of. "mcmc" was not exactly a last name but then McNellis was persuasive. So when I sent a Multics Mail message to Jesse I would address it to "mcmc". That was it.

This was clearly long before issues of identity theft invaded the WWW and Internet, and before hundreds of millions of people became email users.

The result was that the handful of WRD folks who were using Multics or the Harris computers early on had some experience with email. It was how we all communicated with each other. Long-distance phone calls in those days were expensive, like 45 cents per minute or more. Email was free. And, the other person didn't need to be in the office when you wrote to them. They could answer back at their convenience. For better or worse, the emails could be forwarded to others and sent to a whole list of recipients. It was kind of like a telephone answering machine but in writing. Asynchronous communications had a certain power and efficiency that telephone tag did not.

Many in WRD traveled to do their work. Some had a portable email terminal -- the TI Silent 700. Not exactly the versatility or convenience of an iPhone, it looked like a small typewriter with an acoustic coupler built in ---- dial the number of the nearest Multics computer, stick a standard phone handset into the cups (no Princess phone option here), listen to that annoying but mandatory hissing noise that modems made, and 9 times out of 10 you were connected. Just sign in "posson" or "mcmc" and you're on. CCD had only a few Multics phone lines so a busy signal meant to try again later. At 300 bits per second it was faster than any typist and printed at the blazing speed up to 30 characters per second on special heat-sensitive paper rolls. Oh my. Email wherever there was a phone! It was a brave new world. Getting the rolled paper to lay flat was a different issue.



When the Prime computer deliveries started in September 1982, they came with only a rudimentary email capability. Even so, within the first month more WRD staff found email to be amusing or so useful that it was the most frequently used feature of the new computer network. Email became part of the lifeblood of communications in WRD quickly and changed how much of WRD's business was done. It also cut the phone bills because fewer long-distance calls were needed.

Do you remember your first email? Remember those innocent pre-email days when any of us could say "No, I had not received that memo" With emails to all Regional Hydrologists, or all District Chiefs, or all project chiefs or each other it was suddenly possible to inform and request or require actions or responses almost immediately. Ouch. The days of being able to conveniently sidestep management's demands slipped away.

On the bright side, it became considerably easier for project teams and individuals to communicate with each other. Whether arranging logistics for a field trip, or assembling specifications for a procurement, or collaborating on writing a report, or planning a retirement party or even learning of a job opening in another district office, email suddenly accelerated communication throughout WRD. Need to call a project meeting at 10:00 am? Send an email. The recipient didn't need to be online at that moment as would have been the case with a phone call. They would check their email, respond or ignore appropriately and move on. And, there would be a record of the sequence of correspondence to refresh memories.

Of course, one needed to learn to type. Hunt-and-Peck worked OK for many. Managers of a certain age had secretaries who were their windows to the networked world.

Early email was far from ideal. The Prime email capabilities were substantially enhanced by a project team led by Steve Brady in the Kansas District. The team was charged with designing, writing and implementing a new generation of email for WRD. The new generation was built on many of the features of Multics Mail but added others to take advantage of WRD's nearly 5,000 employees, 1,500 terminals and 70 Prime minicomputers then on the WRD network. Email was made available to several hundred WRD cooperators with access to the network, adding still another advantage to working with WRD.

Of course, the primary purpose of the Prime minicomputer network was to make standard WRD databases, hydrologic models and administrative applications available to all. These new capabilities helped solidify WRD's leadership role in hydrology and for that matter in Federal governmental computing.

Over the years email remained the busiest application -- the one used most frequently across the whole network. It was the one that replaced the telephone, the fax, snail mail and all those other so-yesterday technologies. Today, as much as we use email to share information and stay in touch with colleagues and friends and family, we take it for granted. We abhor the volume of junk mail that appears in the inboxes of our iPhones, laptops, tablets and desktops. And we have learned that some of the Internet mayhem that can be attached to innocent-looking emails can be terrifying.

But recall -- it was just 33 years ago when WRD brought those early versions of email to life. It was marvelous. Don't you think? Everyone could communicate with everyone else, and without long-distance fees. It was very democratic. In the world of email, we're all equal. Maybe it was not like that first love, but do you remember your first email?

For the record, my first email was to Fred Sower, head of CCD in Denver at the time. Was his email "sowerf"? Not exactly like Marconi or Alexander Graham Bell's first messages, but "Thanks Fred. Love the Multics Mail. Doug".

Hydrologic History on the Colorado River
by Clint Nagel
April 30, 2015

In the spring of last year, a hydrological and historical event occurred in the Southwest, which I'm assuming didn't gain very much National media attention. I am referring to the release of Colorado River water from the Morelos Dam on the Mexico-Arizona border. I've seen plenty of news reports and press releases online since I began researching this event, so I'm assuming it received some local news coverage. But I don't remember hearing the National news media covering the story in any way, at least not in the way it deserved. I even looked back to see if the event was even mentioned in the Water Resources Division (WRD) Newsletter and Supplemental, but I didn't see any reference there. If I am wrong, then I stand corrected. But I wanted to share this historical event with you just as my first and former supervisor Keith Polinoski of the United States Geological Survey (USGS), shared the news with me. The article that Keith gave me can be found in the 2015 Outdoor Issue of Etched Magazine, Reference (1). The magazine is a publication rooted in St. George, Utah, which extols the virtues of living in the Southwest. The article written by Rowan Jacobsen with accompanied photos by Fred Phillips provided a little more storyline to the background, rationale and involvement into the events leading up to the release of water. I applaud the author's desire and need to tell the story before the public. Jacobsen and Phillips even called attention to the fact that this event had a hydrological significance and that it was ecologically critical to this ecosystem if it was going to exist at all.

It is remarkable when you think about it, remarkable in the sense that this release was even made at all. Considering the drought impacts on an already arid southwest, water is obviously a scarce and diminishing resource. And it becomes even more day-by-day as weather patterns fail to change in a changing climate. But negotiations that began in 2012 between Mexico and the United States led to an agreement called Minute 319, which allowed the Colorado River to flow freely for eight weeks through a parched Sonoran Desert. But don't think of it as simple as that. We most likely can't even imagine the number of man-hours not to mention the number of entities, agencies, and states on both sides of the border that had to be involved for this agreement to be reached.

Even the Morelos Dam itself is not immune from the simple mechanics of administration, operation and maintenance. Built in 1950, the dam lies about a mile south of the junction of the California and Arizona border. The western half of the Colorado River lies in Baja California and the eastern half in Yuma County, Arizona. Mexico is responsible for all the maintenance of the dam, but it is operated by the International Boundary and Water Commission (IBWC), an agency that shares its existence in both Mexico and the United States. I once thought the IBWC was part of the Department of Justice, but I learned that its responsibility lies with the Department of State.

The purpose of the hydrological release was to restore the vegetation in the riparian corridor along the dry Colorado Riverbed in Mexico. As Jacobsen's article states, "it has been 50 years since Colorado River water had reached its long trek to the sea, the Sea of Cortez, on any regular basis." Thus, the lack of replenishing water was leaving the Colorado River delta nearly dry. The release of water was also to simulate the normal pulse of the Colorado River during spring floods. This particular release occurred on March 23, 2014. "The timing of the release was chosen to promote the germination of newly planted cottonwood and willow seeds", as the article states, "by restoration ecologists with the Arizona Sonoran Institute and Mexico's leading environmental group, Pronatura."

As I researched more into this rare event, I learned that water from the Colorado River that reaches the Sea of Cortez has happened before within the last 50 years. But it has not been often, and not on any continuous or routine cycle. For more information you can click on References (2) and (3) reflected at the bottom of this article.

But what, you may ask, was the USGS role in this? Surely they were involved to some degree, right? And the answer is obviously "yes". According to the Department of Interior press release of March 27, 2014:

"The pulse flow, which began on Sunday with the lifting of one gate at Morelos Dam, will run for eight weeks. More control gates will open as the dam releases water at varying amounts and speeds toward the delta, its estuary and the Sea of Cortez. A volume of 105,392 acre-feet of water will flow down the river's channel to help regenerate native cottonwood and willow habitat. The experimental flow also is providing the scientific community the opportunity to gather valuable data from collaborative monitoring activities; these data will inform both countries in developing future management actions regarding water flows in the delta. Scientists from Interior's U.S. Geological

Survey are playing a key role measuring the hydrologic and ecosystem response to the pulse flow.” For more information you can click on Reference (4) at the bottom of this article.

What was the magnitude of the release? The peak flow occurred on March 27, 2014 when maximum releases were at 4,000 cubic feet per second (cfs), and the releases were held there for three days. Following that, flows leveled off to 1,000 cfs for the first three weeks in April. According to the USGS website, most of the flow soaked into the ground in the first 37 miles downstream of Morelos Dam, but over time and distance what water remained from the release did reach the Sea of Cortez. For more information you can click on Reference (5) at the bottom of this article.

As was stated earlier, the purpose of the event was to restore vegetation in the riparian wetlands below the dam. And you know, it looks like the feat just may have worked. According to the National Aeronautics and Space Administration (NASA) website dated Dec. 17, 2014, it states the following:

“When they compared satellite images of pre-flow August 2013 to post-flow August 2014, the researchers calculated a 43 percent increase in green vegetation along the route wetted by the flow, called the inundation zone, and a 23 percent increase in greening of the riparian zone, or the river banks. Scientists presented these and other results this week at the American Geophysical Union’s Fall Meeting in San Francisco.” For more information you can click on Reference (6) at the bottom of this article.

The Minute 319 Science Team consisted of many scientists, including those of the USGS. The team used Landsat 8’s sensors to monitor the response of plants along the riparian corridor to the release of water from the Morelos Dam. For some of you who didn’t know, Landsat 8 is a joint venture of NASA and the USGS. For more information on Landsat 8, you can click on Reference (7) at the bottom of this article.

But I’m not here to tell you what I know, for this event is way beyond my expertise and involvement. However, I am here to say the event happened, and I want to make sure the story gets told. And as I said, “there was a tremendous amount of work that went into the planning, monitoring and analyzing of every aspect of this project.” My hat goes off to all of the technicians, scientists, administrative personnel, and anyone else who participated in this endeavor in any way.

There is so much online information that it is impossible to present it all here, but that’s not my purpose anyway. What I have presented here is just the tip of the iceberg. Once you go to the USGS links, one reference will lead you to another. So, for those of you who didn’t know and would like to learn more, I suggest you follow up. There are good things that are happening in ecological restoration, and I’m proud that my former agency is part of that work.

References:

- (1) Jacobsen, Rowan, 2015, ‘The Day We Set The Colorado River Free’, Etched Magazine, Outdoor Issue, pages 40-49
- (2) http://green.blogs.nytimes.com/2011/11/17/all-rivers-do-not-run-to-the-sea/?_r=0
- (3) <http://www.hcn.org/articles/Colorado-River-pulse>
- (4) <http://www.doi.gov/news/pressreleases/united-states-and-mexico-celebrate-partnership-for-historic-release-of-colorado-river-water-to-delta-benefiting-both-nations.cfm>
- (5) <http://www.oars.com/blog/rafting-historic-colorado-river-pulse/>
- (6) <http://www.nasa.gov/content/goddard/nasa-usgs-satellite-sees-green-up-along-colorado-rivers-delta-after-experimental-flow>
- (7) <http://landsat.usgs.gov/landsat8.php>

Eighteenth Retirees Reunion 2016
Nashville, TN
Sunday, November 6 – Tuesday, Nov 8, 2016

by Pete Anttila, Local Arrangements Committee Chair

We hope and encourage you to join us in attending the next biennial Retirees Reunion in Nashville, “The Music City” on November 6-8, 2016. We plan to have an enjoyable and memorable time. The official Registration Form will be published in the February 2016 Newsletter with information on venue, events, tours, and registration costs.

You may wonder about the early November Sunday-Tuesday date with the last day being “Election Day.” The date was chosen by the Local Arrangement Committee (LAC) after an extensive and frustrating search for an available and quality hotel that met guest, meeting, and banquet room requirements, lowest room costs, and accessibility to downtown Nashville. We quickly learned that Nashville is a popular city for meetings, conventions, and tourists. In addition there is a higher demand for hotels on weekends (Friday and Saturday) during the fall football season. We were most fortunate to book a block of 80 rooms at \$209 per night at the Hutton Hotel, Nashville’s only four-star hotel rated by Forbes Travel Guide. Other dates available with the Hutton are substantially higher. Because early voting is available in all states, the selected date should not be a problem.

The Hutton is 1.6 miles southwest of downtown and 0.25 mile from Vanderbilt University. A free shuttle is available for guests within a 3 mile radius of the hotel. Numerous restaurants and lounges are within walking distance of the Hutton. Because Nashville is within reasonable driving distance from a number of states, a high attendance is expected. In the February 2016 Newsletter we will encourage early registration. If additional rooms are needed, we will request the hotel to increase the number of rooms at the \$209 rate. The earlier we make that request for additional rooms, the better chance for obtaining the \$209 rate. We will do everything possible to optimally accommodate all who want to attend. We encourage you to visit Hutton’s website (www.huttonhotel.com) to learn more about this quality hotel.

We will continue the tradition of past Reunions with tours, opening reception, business meeting, gala banquet and hospitality room. We also are accommodating an IT Meeting to follow the business meeting on the second day. Nashville also is the “Athens of the South” and takes its affiliation seriously. Greek architecture is evident at the Parthenon and antebellum plantations. A Music City Circuit offers free bus service with 60 stops that include the Ryman Auditorium, Bridgestone Arena, Country Music Hall of Fame, Bicentennial Mall, historic Second Avenue, and various restaurants and landmarks. We will assure that attendees will have time to explore and enjoy the City.

“Y’ALL” mark your calendars and come see us in Nashville,

Your LAC Members: Charles and Rebel Gamble (TN), Jim Baker (TN), Jerry Lowery (TN), Gwen Hoover (TN), Bob Burchett (TX), Lori Weir (Lower Mississippi Gulf Water Science Center), and Pete and Joyce Anttila (TN)

NEWS OF RETIREES

Jim Bailey wrote: "It is with great sadness I heard about the recent passing of Tommy Buchanan and Roland Carter – there can't be many members of the old Arlington gang left. WRD has been lucky – they have had a great bunch of people working for them. Unfortunately, our type of government requires change – not necessarily for the better, but to remind people of who is the boss. So much for philosophy. We'll get along with business. My check catches me up with dues and buys the new editor a drink. He's going to need it. Good Luck to all."

Jim Blakey wrote: I vote for USGS Retirees Association as the new name. In regard to NL content, I vote for B - fewer such articles and for D - place news of Retirees first, etc. Here are a few comments for the NL: We have 10 or 12 folks here in Denver that has helped hold the Retirees together. We are still having a first Monday and a second Tuesday lunch and a third Thursday breakfast. I don't like to miss a meal, so I usually make all three! At our spring lunch we had 27. Not too bad, but we are trying to get more. The best news is that Jim Kircher is joining us. We need the young blood. Now for a personal note -- Paula and I became great grandparents in February with the birth of Wyatt, and Jack arrived in March. We expect number three in July."

Steve Blanchard wrote: "Hello to all my WRD Retiree friends. Sorry I have been so lax in providing updates. Since retiring in June 2011, my wife Julia and I have been preparing for overseas church work. After retiring, we both enrolled in seminary in Columbia, SC to get more theological training. Julia got an MA degree in pastoral counseling and I got an MA degree in theological studies. Our church in the States, Reston Bible Church (VA), has supported missionaries in Ireland for many years. We learned that those missionaries had just lost a senior couple from their team. So we began exploring the possibility of coming to Ireland to help with their church work and to fill the spot left by the other couple. We visited Ireland in February 2014 so they could check us out and we could check them out. The visit went very well and we were encouraged to come over. So we got our house in Sterling, VA ready for sale; put it on the market in early July 2014; and it sold to the first person who came to look at it. We closed on the sale of our house in August and arrived in Ireland with six suit cases of belongings at the beginning of September 2014. We are renting a very nice apartment in the city of Douglas, County Cork, Ireland. We are in a suburb of Cork, the 2nd largest city in Ireland. We have settled in very well. We bought a car; obtained a visa for permission to remain in Ireland for a year; are driving comfortably on the left side of the road; and have been very active in church work. We attend and help with Douglas Baptist Church and are working to plant a new church in a nearby town, Passage West. We have been able to travel around Ireland a lot and have seen many beautiful sites but there is sooooo much more to see. If any of you are heading over this way, please contact us; we would love to visit with you. Our contact info is: Steve and Julia Blanchard; 65 Elden, Maryborough Hill, Douglas, Cork, Ireland; Steve's cell 353-86-088-7152; landline 353-21-241-5028; email: spring.grove10@gmail.com. We also send out a newsletter about every two months; if you would like to be put on our emailing list, send us an email."

Dick Bloyd wrote: "Please use my enclosed check to pay for my delinquent dues and the rest for my future dues. Thank you."

Charles Bryant wrote: "I attended my 55th college graduation reunion from Harding University in Searcy, AR in October 2014. While at the reunion, I was named to the Harding University President's Council. My service with the U.S. Geological Survey, Water Resources (WRD) began in 1959. I was hired by the WRD's Office of Water Quality Branch in Portland, OR soon after I graduated. I worked for four years in the Portland Water Quality Laboratory. In 1963, I transferred to the WRD office in Little Rock, AR to manage their laboratory. I worked there for the rest of my career until I retired in 1987. In 2005, I moved to Maryville, TN. While working in the Little Rock office in 1965, I joined the American Chemical Society (ACS), and early this year (2015), I was honored for 50 years of service (1965-2005) with ACS. In April of this year, I was also honored by the University of Tennessee, ACS Section for my 50-year service with the ACS."

Dave Camp wrote: "Just a quick note to let you know I'm still kicking. My dues check is enclosed. Use two years for dues and the remaining amount for the scholarship or other needs. I'm still doing well health-wise. The Dr's discovered that my body is making too many red-blood cells and as a result of that testing, also discovered that my platelet count was 'jumping around'. They prescribed a 'very ugly' medication (if you read all the warnings – you would never take it) but it seems to be working. I would never have known that I had a problem had not the blood test showed it. I don't seem to be affected in any way and the medication doesn't seem to bother me. However, I can tell that I'm getting older. It's getting much more difficult for me to walk 18 holes in the hot weather than it was a few years back. However, I still show up at the golf course a couple of times a week – but I do take a cart when the temp is 95 or above. My handicap is beginning to climb along with my age, but I'm still maintaining an 11 handicap at present. I don't like that, but it seems it is the best I can do. I'm still gardening – have tomatoes and black-eyed peas growing at the present. It's about to get too hot for the tomatoes to set fruit, but the black-eyed peas love the heat. We will put up 20-30 pints in the freezer for future use. I retired from my volunteer choir directing at the church (did that for 18 years) but still sing in the choir and am still asked to sing at many funerals. I'm very grateful for the musical talent given me. I still enjoy reading the newsletter and hearing about colleagues from yesteryear. However, they seem to be getting fewer and fewer. Thanks again for all the hard work you guys do in keeping up with us and getting the newsletter out each year."

Tony Coffey wrote: "Enclosed is a check for my 2015 dues. All is well in Sooner-land except for the earthquakes. I hope my house will survive and my Garber well water doesn't get polluted. Maybe someone in the USGS will figure out what is causing the earthquakes before it's too late."

Judy Cornwell wrote: "It has been a while since I've updated our retirees via the Newsletter. I remain in good health and enjoy the monthly breakfasts with Denver Federal Center retirees. My husband had a mild heart attack in May. After various tests, an angiogram showed an artery that was 90% blocked. They put in a stent, kept him a second night, and sent him home the next day. He is back to volunteering at St. Anthony's, while fitting in some cardio rehab there, also. I help to assemble our church bulletins halftime, volunteer at the Lakewood Heritage Center, and sing with the Lutheran Chorale. We have given up on our 2000-plus mile annual trip to the mid-west and back, but we look forward to attending three operas in Santa Fe in August. Our 4th great grandchild – a girl – is due any day. That will give us two of each. We just had word of a 5th great grandchild on the way in January. We are very blessed, and pray God's blessing on all of you, too."

Terry & Nina Danielson wrote: "Enclosed is our dues and past dues. It will pay for two years with a little extra. We are doing OK. I (Nina) had a shoulder replacement in February and still have quite a bit of pain. Terry is doing fine. He still rides the bike about 10 miles and continues to exercise. Because of my health, we haven't done anything too exciting or interesting. We are still in the same place in south Utah. If in the area give us a call, would love to have you visit us. We hope every one of you are good and planning for a good summer. Thinking of you all. Fondly"

Jack Edmonds wrote: "The enclosed check for 2015 dues and the extra can be applied to anything appropriate. My record keeping is not so good, so I'm not sure if I only owe for one year. Thanks for your patience."

Kate Flynn wrote: "Debbie McLean and I had a nice visit with **Eileen Smith** after Frank's funeral at Arlington National Cemetery. The service was very nice. We also saw Bev McCoy who asked we say hello for her. Eileen asked me to pass on a message from her. She says **Harry Barnes** could use some phone calls. He is very isolated, completely blind, and his son who cares for him is fighting cancer. She had a long conversation with him recently and really encourages others to call. I don't really know who all may have known Harry, but Eileen would appreciate it if you could call Harry and if you would pass this on."

Mike Frimpter reports: "Ali and I have just returned to flat Florida from a railroad trip through the Canadian Rockies followed by a cruise from Vancouver up through Juneau, Skagway, Glacier Bay National Park, and Ketchikan back to Vancouver. After retiring to south Florida, every so often we need a mountain fix. This time, we got it in grand style where landforms, evidence of earth processes, and even the trees are all very large

(sure beats the scale of the Berkshires of Massachusetts and the Catskills of New York). Then, on June 17th NASA announced discovery that, based on data from their GRACE satellite system, the world's aquifers are being depleted. Eventually, I thought it confirming to have hydrologist's inventories corroborated from afar. Of the names suggested to replace "WRD Retirees" I prefer "USGS Retirees Association" because it does not suggest any preference for different interests, skills, training, or "discipline," and therefore be more likely to appeal to a broad spectrum of future retirees."

Harold Golden wrote: "The article (to view the article click on the website below) in the Springfield, MO, News-Leader has a very nice write-up on the use of USGS gages by canoeists. Shane Barks and the Rolla personnel are doing a good job of informing the public of another use of USGS information. Marie and I are OK, considering our years. Thanks to all for the folks in Reston for their efforts with the Newsletter."

<http://www.news-leader.com/story/news/local/ozarks/2015/05/22/high-float-usgs-river-gauges-can-help/27797693/>

George Gray wrote: "Enclosed is a check for my dues. I don't think I am too far behind in my dues but please bring me up to date and pay forward with the remainder. I enjoy reading the newsletter very much."

Tom Higgins wrote: "Enclosed are dues for 2014, 2015 and 2016. Sorry for being late – but the last few summers we were bushed with commitments to FEMA related disasters. A lot seemed to occur during the summers. Getting closer to retiring, a second time, after completing 15 years as a part-time employee of FEMA. It's been a good and worthwhile experience, my wife and I have seen a lot of the US."

Paul Jordon writes: "In the new directory I see Carolyn listed as my wife. I had neglected to inform you that she died on March 7, 2014. When seeing news about extreme flooding in several parts of the U.S. I regret not having completed a project I started shortly after I retired: a new version of Maximum Floodflows by region. It would have benefited from more than double the station-years of data and correction or elimination of some questionable data. Oh well, maybe someone is working on such a thing right now but with even better methodology."

Florence Koopman wrote: "I'm sorry but I think I neglected to pay 2014 dues. I do enjoy hearing about Frank's former co-workers, their travels and activities. Since Frank's death, I don't do as much travelling, but I'm doing OK."

Joe Moreland wrote: "Andy, I discovered that I have been in arrears on my WRD Retirees dues. Not sure how that happened, but I assume it has something to do with senility. I'm posting a check to you today to cover dues for two years (my deficiency and to also cover dues from my wife Kaycee who is now officially a retired (deferred) WRD former employee), and any extra can be used towards the Scholarship fund. She would like to be recognized as a WRD Retiree and listed as Kaycee L. Moreland in the Directory. This will be a busy summer for us with three weddings of grandchildren and a nephew; high school graduations for two granddaughters; and, a visit with my first great granddaughter, Autumn Noel. We will be driving to the Seattle area several times this summer to attend all the events. Kaycee is planning a trip to Oregon to attend a reunion with former classmates and I have been invited to a reunion in Butte, Montana with my old (literally) elk hunting buddies. I'm still selling a few copies of my memoir, A Place to Lay My Head, and have over 550 in circulation now."

Stan Leake wrote: "Greetings, thanks for sending me the current issue of the WRD retirees' newsletter. My preferred method of delivery is an email announcement with a link to the HTML version of the newsletter. My retirement was in September, 2013 and I worked half time for the USGS from immediately thereafter until December, 2014. Soon I will be going back to work half time for the USGS on an appointment that will end in September, 2016. You might want to list me as a 2013 retiree. Thanks"

Lee Lenfest wrote: "It is with a very sad heart that I wanted to inform friends and colleagues in the WRD that my dear Leah Sprague, my life's partner passed away on December 23, 2014 from pneumonia. Leah met many of my friends at the recent WRD Reunion in Portland, ME. I met Leah while working for USGS in Casper,

WY in 1975. We both played in the Casper Orchestra. After dating for a while, we went our separate ways when I left for Cheyenne in 1978 and Reston in 1985. After retiring in 2002, I moved to Maine. Leah contacted me in 2012 through social media after 30+ years apart. After a lot of phone calls, skypeing and e-mail, two trips to Maine, and a romantic Canoe ride on Coleman Pond I convinced her to join me in Smithfield, ME for our sunset years. We had two and one-half years together and I will always cherish our time together."

Larry McGreevy wrote: "Thanks for the Retirees Directory and the dues reminder. (It's interesting that I'm listed as a spouse (SP)). Enclosed is a check to cover five years dues. Use the rest of the check for your expenses. Amazing how the WRD Retirees have survived the USGS organization earthquakes. I hope a new name can be found that will let newcomers feel included. Evolution will happen, but the most important thing is that the spirit doesn't change. Unfortunately, for Retirees the "In Memoriams" section eventually becomes one of the most important sections in the Newsletter. I'm finding that I know a lot more people in this section than in the rest of the Newsletter. My own life is pretty stable. My health is still pretty good for my age. Missing my Joan is kinda tough, but life is just like that. To keep myself busy I'm spending a lot of time learning more about history and science through "the Great Courses" videos. I'm mostly trying to figure out what the scientists mean when they talk about quantum and gravity. They aren't saying the same thing as they said when I was in school. Even though I'm too far behind to fully understand, I find it fascinating."

Chuck Robinove wrote: "Thanks for the continuing newsletter. I read it all and enjoy it, except for the obituaries (but I'll be there someday). Also thanks for the link to the GD Newsletter; I found a lot of friends there. And that's basically why I am writing this. I spent 20 years in WRD and another 12 in the EROS Program and the Director's Office. I also spent a couple of years in the E-1 building in Newton Square, if that means anything to anyone; I can't discuss it. So my reason for going on like this is that I do not like the parochial view of the WRD and the GD newsletters; it's like these organizations are the cream of the crop and should be left alone. I don't like that; I spent a lot of time working with people throughout the Survey, had a lot of non-water colleagues, and made a lot of friends in other Divisions and the Director's Office. Some years ago I suggested that there should be a Geological Survey Retirees Group and mailed my suggestion to the WRD Retirees. I received in return a very snotty note from a bigwig in the organization (whom I knew well and had authored a number of publications with) who informed me that WRD was an elite group and did not want or need to be associated with any other group in the Survey. Facing an attitude like that, I just dropped the subject. But now, with WRD gone, the group can only last until the last member dies, and then it too will be gone. I suggest (again) that y'all get together with the GD Retirees (and perhaps the Topo Retirees, if there is such a group) and form a Geological Survey Retirees Group, to be all-inclusive. After all, the Geological Survey will be around for a long time and its constantly reorganized divisions do not need to be so parochial and self-centered. I hope that you can seriously consider this suggestion and I would be quite interested in the results of your deliberations."

Lee Trotta wrote: "As far as what the content of the newsletter should be, I prefer your option # C. You could also include articles of local interest written by USGS retirees still in touch with water education, such as the article attached (published in Wisconsin Ground Water Association newsletter). The article is called Tales of Marblehead, pages 6-10. **Here is the link:** <http://static1.1.sqspcdn.com/static/f/1103553/24377740/1392394667433/WGWA+Newsletter+Vol+28+No+1+February+2014.pdf> . Beth and I are following the adventures of our faraway daughter (Natalie) and helping raise the children of our close son (Kyle). Natalie is currently wrapping up her months-long trip to southern Africa which took her to the top of Mt. Kilimanjaro, safari camping, the island of Madagascar, and the southern tip of the continent. Along the way she established a couple of charitable foundations and had an article published in *Backpackers Travel Magazine*."

Pat Tucci wrote: "Sorry that it's taken so long to respond to the questions in the last newsletter. I think the organization could be open to all USGS employees, mainly because there is no WRD now (just a Water Mission Area and who knows if that's what it'll be with the next reorganization). Calling it USGS Retirees would cover that, but whether retirees from the other former Divisions will participate is questionable. As the newsletter said, GD has their own retirees group. I like the newsletter, and I think that it should continue to focus on the retirees and what they are up to, with science articles included in the supplement. I like the

historical articles and "tall tales" of past exploits from the retirees. Here's a little update to what Zelda and I have been up to lately: In April we returned to Namibia on a "mineral safari". We recently purchased the company that used to lead those, and took the trip in April to see if continuing to do the trips was feasible (it is!). Namibia is a fascinating, scenic, friendly, and safe country to travel in. English is the official language, and the water is safe. The trips are about half mineral-related (buying from miners and dealers) and half wildlife/scenery/culture. You can learn more about them at www.geodite.com. In May, we joined USGS retiree Ken Hollett and his wife, Claudia Stone, on an Alaska cruise and had a great time. The weather was fantastic and the scenery and wildlife were incredible. On the way home from the cruise we stopped to visit our daughter in Oregon, to help her start planning (and spending) for her wedding. We continue to stay busy with our other business (GEOdyssey, LLC), buying and selling minerals and fossils. Looking forward to the reunion in Nashville and the chance to visit our friends there."

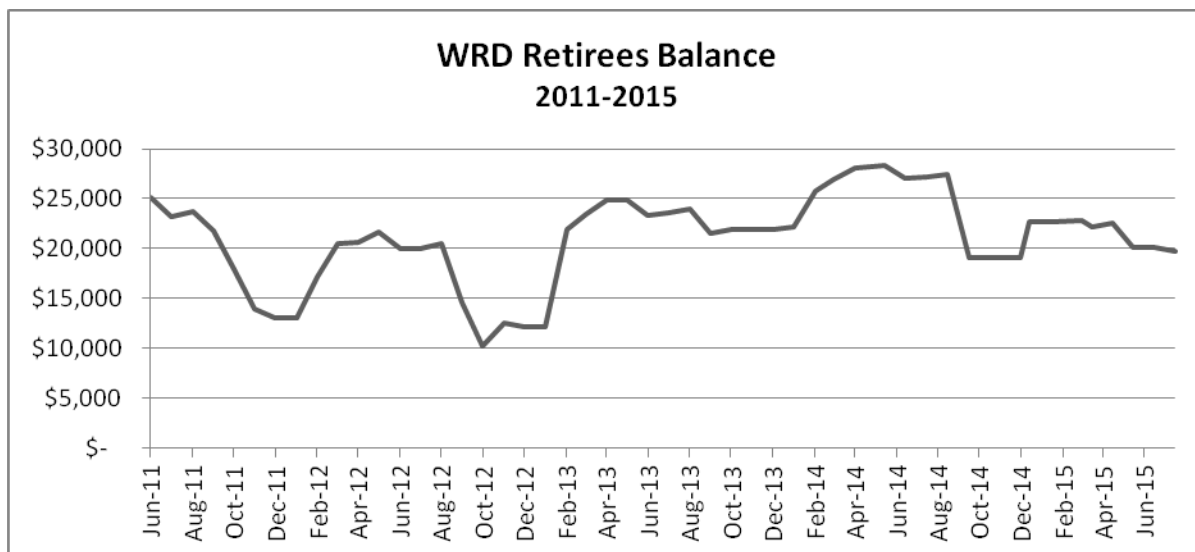
Chet Zenone wrote: "Hello Andy, So.....how many years do I owe for? (Yeah, I know an olde editor should not end a sentence with a preposition.) All's well and still enjoying retirement out here on the Left Coast. Hope you and Mary are doing well and in good health."

TREASURER' S REPORT, SECOND QUARTER 2015

Treasurer Celso Puente reports that the organization had \$19,794.45 in its treasury at the end of the second quarter for calendar year 2015. Receipts for the quarter were \$2,820.52 from dues and contributions from 98 members. Distributions for the quarter were \$5,607.24, including the cost for the printing of the WRD Retirees Newsletter and Directory, and support funding for the WRD Reunion in Nashville, Tennessee. During the quarter, a total of \$590.00 in contributions above dues was received from 34 members.

Special thanks for contributions above dues go to :

John E. Coffin, Herb Frieberger, Edward Koerkle, Laurence McGreevy, Carolyn V. Norton, Bruce P. Hansen, Elizabeth W. Smith, Bobby G. Byrd, David C. Madrill, Paul R. Jordan, James F. Bailey, Richard Bloyd, Steven Hindell, David J. Camp, Judy I. Steiger, Amy Swancar, Harold Golden, Douglas Posson, Marjorie Reid, Ren Jen Sun, Philip Cohen, Vincent Lai, Rick Iwatsubo, James B. Baker, John Edmonds, Stanley A. Leake, Terence Danielson, Peter W. Anttila, Lenny J. Fakula, Solomon Lang, Joe Moreland, Roger Rumenik, Deborah Lumia, and Mary J. Dunn.



MEETINGS AND GATHERINGS

WRD Retirees – HI Luncheon June 2, 2015



Left to Right: Salwyn Chinn, Ben Jones, Mae Jones, John Yee, Amy Watanabe, George Dayag

WRD Retirees – IN Luncheon June 18, 2015



Front to Back (Right Side of Table): Lee Watson, Jeff Martin, Dave Cohen, Debbie Morgan

Back to Front (Left Side of Table):
Dennis Stewart, Rick Goss, Sharon Goss, Randy Keeton, and Brian Benedict



WRD Retirees – OH Luncheon April 14, 2015



Left to Right: Jerry Stewart, Max Katzenbach, Rich Fehs, Bill Yost, Jim Mangus, Cindy Mangus, Steve Hindall, Sandy Hindall, Sandy Beck, Dean McFadden, Janet Welday

WRD Retirees – TX Luncheons

May 20, 2015: The May meeting of the Texas WRD Retirees was held at Big Daddy's was complemented by five members and guest. Those members that came were: President, Bob Burchett, Sec.-Treasurer, Clarence Welborn, Frank and Cindy Wells, Paul Rohne and his guest Ree. Bob Burchett opened the meeting by wishing everyone a good morning and commented on the number of people 'A record for a long time'. Bob went to Nashville recently and worked with the committee for the 2016 Reunion. He said that Nashville was a fun place. Paul Rhone said that he and Ree went to San Antonio over the weekend for the graduation of a grandson from high school. It was a mad house. CT said that he had been eating lunch out two times week with friends, playing bridge on Thursday, and reading a lot. Senior transportation takes CT to his lunches, bridge, and any other place in the city limits he might want to go. But it can't take him fishing. Therefore, he hasn't been able to find a ride. Before he goes to the June meeting, he will have an operation, June 12th, on his foot for a falling arch. In late summer, he will have the other foot done. Frank Wells said he was still living on his "ranch" in Liberty Hill and enjoying the rain. He said that his grass was about waist high. **CTW**

June 17, 2015: Only three members and guest came to our June meeting. Those were the usual: Bob Burchett, Clarence Welborn, Paul Rohne, and his friend, Ree. There was no discussion of any travels or personal stuff. However CT said that he did go cat-fishing the last two Saturdays, but struck out. His excuse was that Lake Travis was too screwed up. That's all there is, folks. Our next meeting will be Wednesday July 15, 2015 at Big Daddy's, located at 9070 Research Blvd. at 1130 hours. **CTW** (TX WRD Retirees' Newsletter)

Special Note of Appreciation and Thanks to Anna M. Lenox, WRD Retirees Northeastern Regional Editor

Anna has recently announced her retirement as a volunteer Regional Editor for the Northeastern Region of the WRD Retirees Organization. In appreciation for her service, and on behalf of the WRD Retirees, I would like to personally thank her for her excellent contributions to the successful publication of the WRD Retirees Newsletter. Anna's work ethic and her professional skills significantly improved the editorial quality of articles submitted by authors to the newsletter. Her work was professional, timely, and provided clear writing without changing the core message of the articles that the authors intended. Thanks again to Anna for the time and energy she contributed during her three years of service to the WRD Retirees Editorial Team in producing the newsletter that so many (about 1,400 members) of our retirees truly enjoy. We wish Anna the best on her new endeavors.

News of a New Replacement for Anna M. Lenox, Former WRD Retirees Volunteer Northeastern Regional Editor

At this time I would like to take the opportunity to announce that Dorothy Tepper, the former Northeastern Regional Reports Advisor for the USGS, WRD has accepted the volunteer position as the new Northeastern Regional Editor for the WRD Retirees Editorial Team. While employed with the USGS as the reports advisor for the Northeastern Region for more than seven years, she exhibited her extensive experience and superb skills in reviewing scientific reports produced by authors in the Northeastern Region. She not only reviewed the reports for editorial quality, but also for the technical soundness contained in the reports as well as any policy issues that occasionally arises. Dorothy will be a valuable member of the WRD Retirees Newsletter Editorial Team. Welcome to the WRD Retirees Newsletter Team.

Signature by
Tim Smith, President, WRD Retirees

CHECK NARFE FOR LATEST ON OPM DATA BREACH

OPM security breach updates can be found on the web site of the National Active and Retired Federal Employees (NARFE) at <http://www.narfe.org/>

RETIREMENTS

Patricia ‘Pat’ Alex retired on April 30, 2015, after working for over 24 years at the National Water Quality Laboratory (NWQL), Office of Water Quality, Lakewood, CO. Pat began her career as a physical science technician analyzing metals on flame Atomic Absorption Spectrometry (AAS) and Inductively Coupled Plasma (ICP). She also ran anions by Ion Chromatography (IC), Chemical Oxygen Demand (COD), Suspended Solids and Residue on Evaporation (ROE) analyses. As a NWQL team member, Pat also participated in the development of National Water Quality Assessment (NAWQA) procedures for sample submissions, and helped design and set-up the NWQL 21-Day Sample Storage Area. She had been detailed to the New Mexico District Rio Grande NAWQA, Louisiana Water Science Center, and Colorado Water Science Center. In 2000, Pat moved from Analytical Services to the Business Development Team, providing customer service and working as the physical scientist in the Log-In-Unit. She had been the "go-to-person" for all samples and Analytical Services Request (ASR) logged in, and the point-of-contact for questions and problems during her tenure. Depending on the issue, Pat's role had been one of coordinator, educator, and problem solver. Pat's skills have benefited both technically and personally WRD's water studies, and improved the quality of USGS scientific output. Pat will be missed by all. Please join me in thanking Pat for her outstanding service, support, and dedication and wishing her the best in retirement.

Cynthia ‘Cindy’ L. Brown, after more than 30 years of service, retired on 31 July 2015 from the U.S. Geological Survey's (USGS) National Research Program (NRP), Water Mission Area, in Menlo Park, CA. Cindy started her USGS career in 1984 as a Laboratory Technician in the Geologic Division in Menlo Park, CA. In 1986, she managed mineral analyses in chemistry laboratories as a Geologist, and in 1990, joined the project ‘Availability of Trace Elements to Aquatic Organisms’ as a Physical Scientist in the NRP. Her work broadly dealt with the bioavailability, fate, and effects of trace metals in the northern San Francisco Bay and Delta, and specifically with habitat-dependent bioaccumulation of trace metals in clams and its resultant effect on clam physiology. This important work is still ongoing. In 2009, she became Assistant Branch Chief in the NRP's Western Branch in Menlo Park. Her multitude of duties, which include program planning and development, setting budget priorities, project personnel assignments, and space and facilities use and planning, have been critical to Branch Operations, and hence Bureau Science. Her outstanding service and quality of work have earned her widespread respect from colleagues. Cindy has received multiple service awards and the Shoemaker Award for Communication Product Excellence. She served on the editorial board of the *“Bulletin of Environmental Contamination and Toxicology”* and was the coordinator of the Toxics Substances Hydrology Program for the San Francisco Bay Estuary. She served as an organizer of the regionally important Biennial State of the San Francisco Bay Estuary Conference for 20 years. Cindy has been a highly valued leader, team member, and mentor to the NRP. Please join me in wishing Cindy continued success in life and career beyond the USGS. A celebration of Cindy's retirement was held on Friday July 24, 2015.

Richard ‘Rick’ W. Healy - In his usual understated manner, Rick Healy retired on July 2, 2015 after 40 years of service to the U.S. Geological Survey (USGS). Rick started his career with the USGS shortly after completing a B.S. degree in Mathematics and Computer Science at the University of Illinois, where he also earned an M.S. degree in Mathematics and Numerical Analysis. Rick worked in the Illinois District Office for 11 years, starting as a hydrologic technician and spending the last 4 years there as project chief on a study of water and radionuclide movement through the unsaturated zone at the Sheffield low-level radioactive-waste site. In 1986 he joined the National Research Program in Lakewood, CO. As a member and leader of the Unsaturated Zone Field Studies Project, his major areas of research included development of numerical models for simulating flow and transport processes in the unsaturated zone, evaluation of groundwater recharge processes, and assessment of impacts of energy resource development on water resources. Rick led the development and support of the VS2DI package of computer models for simulating water, solute, and heat transport through variably saturated porous media. He taught numerous short courses on the theory and application of the models as tools to solve practical problems. His report, USGS Circular 1308 (<http://pubs.usgs.gov/circ/2007/1308>), “Water Budgets: Foundations for Effective Water-Resources and Environmental Management” has been a tremendously effective outreach tool to educate lay audiences on the

concept and importance of water budgets, and to illustrate that, although simple in concept, quantification of water budgets can be complex, demanding, and laden with uncertainty. Rick is an internationally recognized authority on methodology for estimating groundwater recharge, and published the widely used textbook *“Estimating Groundwater Recharge”*. He recently has applied a host of advanced scientific tools to inform resource managers responsible for maintaining sustainable water resources in areas of intense energy development, and authored USGS Circular 1407 (<http://pubs.usgs.gov/circ/1407>) *“The Water-Energy Nexus—An Earth Science Perspective”*. Rick has mentored many students and scientists, and has served as a leader for USGS and the broader scientific community. We are fortunate to have Rick carry on his collaborations and contributions as a USGS Scientist Emeritus after retirement. Rick is also looking forward to having more time for his many interests outside the research community, including hiking, backcountry skiing, and cycling. Join me in thanking Rick for his service and many contributions.



Scott Jackson retired on July 3, 2015, after 37 years of service and leadership with the USGS. Scott began his USGS career in 1974 quite serendipitously by literally walking in the front door of the Columbus, Ohio District office and asking “Do you have any jobs here?.” Actually, there was a job available washing lab ware. Scott, nearly broke at the time, readily accepted the position and unknowingly a long-term career with the USGS was underway. To escape the exciting world of dish washing, Scott hastily transferred to a hydrologic technician position to have the opportunity to work in the great outdoors as a streamgager. In this role, he had the opportunity to work with some of the District engineers and really enjoyed working with these folks and the studies they conducted. These experiences led Scott to attend The Ohio State University and earn a B.S. in Civil Engineering. After graduation, Scott worked as a hydrologist/engineer, conducting numerous and varied hydrologic and flood-related studies. Always interested in new technological developments, he was an early adopter of tools that could enhance water-science study capabilities, such as Global Positioning System (GPS) surveying, and geographic information system (GIS) mapping techniques, and the most up-to-date computer models. Scott began his career in management by serving as the Hydrologic- and Hydraulic-Studies Section Chief. In this position, he demonstrated a strong penchant for meeting with cooperators and developing new programs to help them address their water-resource issues. Scott had many great work opportunities as a Section Chief, such as serving as the Acting Director of the South Dakota Water Science Center in Rapid City. He also had a founding role in helping to promote and formulate the USGS Flood Science Initiative, which led to the successful National Flood Inundation Mapping Program that improves USGS hazard prediction capabilities and helps to mitigate flood losses throughout the Nation. In the latter part of his career, Scott enjoyed serving as the Deputy Director of the Michigan-Ohio Water Science Center. In retirement, Scott plans to pursue his passions, which include nature photography, studying jazz guitar, improving his golf game, staying involved in water-resource and environmental issues, and making sure he avoids spending winter months in Ohio.



Mastin M. Mount, a hydrologic technician, retired from the USGS Maryland-Delaware-Washington DC (MD-DE-DC) Water Science Center on May 29, 2015. He retired after 25 years of valuable service in performing hydrologic data collection and analysis functions. He worked his entire career in the Maryland Office of the Science Center and was assigned as a project technician for the duration of that time. His first assignment was on the “Chesapeake Bay River Input Program.” The project was designed to measure the loads of all the major water-quality constituents, including suspended sediment that entered the Chesapeake Bay through its tributary streams. This project provided important hydrologic information for the ongoing multiagency effort to restore the health of the Bay. Mastin was totally involved in this water-quality monitoring effort. In later years, Mastin was reassigned to another program at the Aberdeen Proving Ground, Maryland, one of the largest technical programs in the history of the Science Center. The program was funded by the U.S.

Army to determine the extent and degree of contaminants that leached from many of the waste disposal sites into ground or surface water. Mastin was instrumental in developing an on-site “clean laboratory” for analyses of water-quality samples, especially for sites at the Aberdeen Proving Ground. The Science Center provided the U.S. Army with numerous hydrologic remediation options at many of the waste sites for about two decades. Mastin will be missed not only as a valuable hydrologic technician but also as a great team member and friend.



Michael ‘Mike’ M. Reddy retired from the National Research Program-Central Branch (NRP-CR) on May 1, 2015 after 35 years of service with the USGS. Mike received a Ph.D. in chemistry from the State University of New York (SUNY), Buffalo, NY and did postdoctoral research and teaching there as well. He was a research assistant at Western New York Nuclear Research Center, Buffalo, NY; an instructor in physical chemistry at Millard Fillmore College (SUNY), Buffalo, an instructor in the Chemistry Department (SUNY), Buffalo, NY; a research scientist at the New York State Department of Health in Albany, NY; and, a visiting scientist at the U.S. Geological Survey (USGS) National Headquarters in Reston, VA. In 1980 Mike accepted a position with USGS, Water Resources Division (WRD), National Research Program and moved west to Colorado, where he has been ever since. Mike has authored or co-authored 170 reports and journal articles over the course of his career--a remarkable achievement. He is recognized as a leader in the fields of kinetics of calcium carbonate formation and dissolution under a variety of conditions and in the presence of catalysts and inhibitors. Calcium carbonate formation is of fundamental importance across the science of geology and extending into oceanography, biology, and other fields. Mike’s research has taken him all over the Nation and the World, including the Florida Everglades, the Grand Canyon, Pyramid Lake in Nevada, and the Yukon River in Alaska; and, working with scientist in the United Kingdom and Greece. His enthusiasm for science in general has resulted in numerous collaborative studies working with scientists from diverse fields. He has been awarded the Department of Interior (DOI) Meritorious Service Award for his many leadership roles in the USGS, which include service as a Research Advisor and a 10-year term as NRP-CR Chief. We are fortunate to have Mike carry on his collaborations and contributions as a USGS Scientist Emeritus after retirement. Mike is also looking forward to having more time to spend with his family and dogs, and on his many interests outside the research community. Please take an opportunity to thank Mike for his 35 years of service to the USGS and the Nation.

ANNOUNCEMENT: New USGS Deputy Director

To: All U.S. Geological Survey Employees

From: Director’s Office, Office of Communications and Publishing

Bill Werkheiser has been selected as the new USGS Deputy Director. In this role, he will be responsible for assisting the Acting Director in leading the Nation’s largest water, earth, and biological science, and civilian mapping agency.

Bill has been an asset to the USGS since joining in 1986. He has served as Assistant Director for Water since 2010. Prior to this position, he was the Regional Director for the former USGS Eastern Region, where he oversaw activities related to biological, geographical, geological, and hydrological research and assessments. He has worked in a number of acting positions throughout USGS, and he led the Natural Hazards Initiative Team and the long-term Hurricane Katrina Response and Recovery Team for the USGS. He has over 25 years of experience with the USGS and other agencies working on a variety of environmental and scientific issues.

Bill received a bachelor’s degree in geology from Bloomsburg University and a master’s degree in hydrogeology and glacial geology from the University of Massachusetts.

Bill will continue as the Associate Director for Water until a new Associate Director is selected and reports for duty. Mark Sogge continues in his role as acting Deputy Director.

IN MEMORIAMs



Warren Anderson, 93, of Longwood, FL, passed away on May 7, 2015 at Florida Hospital South, Orlando, FL. He was born on December 9, 1921. Warren served in the U.S. Air Force during WWII as a radio gunner. He was shot down over Austria and spent 5 1/2 months as a German POW. Following his World War II service, Warren graduated from the University of Florida with a degree in Agricultural Engineering. He started his career with the USGS in the mid-1950's as a hydraulic engineer involved with the various basic-data activities of the Surface Water Branch in central Florida. In the late-1950's, he was assigned as the surface-water discipline member of a three-hydrologist project team to study and describe the water resources of Orange County (Orlando area), FL. Warren was a well-rounded Hydrologist as he was very knowledgeable in multi-discipline hydrology. He authored and co-authored 13 reports, on such topics as ground-water/surface-water relationships, especially in lake areas. Warren was noted for his perceptive understanding of surface-water/ground-water relationships. He also worked on complex investigative projects, including a number of extensive complex tidal-flow studies in the lower St. John River, determining streamflow characteristics (flood flows, base flows, and low flows), and streamflow regimes and their relation to seasonal water temperature and quality of water, and aquifers beneath the streams, studies on lake hydrology and numerous investigations on the geohydrology of major aquifers, such as the Floridian aquifer in Florida. Warren shared his broad experience and knowledge of hydrology in the Orlando area as an advisor and mentor to less experienced colleagues. He retired in 1985 from the Orlando, FL WRD office. He was preceded in death by his wife Helen, his parents, and one brother. Survivors include a brother; a niece; a half-sister and her two sons; two sisters-in-laws; and, his best friend, Duke (family dog). His hobbies were golfing and reading. Visitation was held at 11a.m. on May 11, 2015 at the Baldwin Fairchild Funeral Home East Altamonte Springs, FL, it was followed by a funeral service.

Lois A. (Goodell) Arnow, 93, passed away peacefully at home December 14, 2014. She was born March 11, 1921 to Lewis Goodell and Glen (Reese) Goodell in Lorain, OH. Lois received her Bachelors' Degree in Nursing from Columbia University in 1949 and a Masters' Degree in Botany from the University of Utah in 1971. Lois was a Veteran of World War II, serving as a Nurse Officer with the U.S. Public Health Service in Egypt and Greece. While attending Columbia University on the GI Bill, Lois met the love of her life Ted Arnow, and they were married on September 23, 1949. Lois and Ted lived and worked together in New York, Guam, Texas, Puerto Rico and Utah. Her greatest joy was raising and teaching her twin sons, Dan and Don. Her curiosity, patience, humor and loving nature lives on in her sons. During her long botanical career Lois authored or co-authored seven publications and books. Her book, "Flora of the Central Wasatch Front Utah" is still used as a botany textbook at the University of Utah. At age of 86 Lois had nearly finished a new "Flora of the Central Wasatch Front" when, eclipsed by the weight of years, she turned it over to her successor at the University of Utah, Garrett Herbarium, for completion. Lois loved cats and tolerated dogs, collected hippos, and enjoyed her botanical work, her flower gardens and reading. Lois was preceded in death by her parents and her two brothers. *(Please reference Ted's article below regarding their 'celebration of life' service.)*



Theodore 'Ted' Arnow, 93, followed in death his lifelong love and wife of 65 years peacefully at home December 18, 2014. He was born July 27, 1921 to Morris Arnow and Ida (Goldfarb) Arnow in New York, NY. Ted received his Bachelors' Degree in Geology from New York University in 1942 and a Masters' Degree in Geology from Columbia University in 1949. Ted was a veteran of World War II serving in the Navy. He survived the sinking of the ship he commanded during the invasion of Okinawa and was discharged eligible to wear the Asiatic-Pacific ribbon with 4 battle stars, the Navy Unit Commendation, and a Bronze Star Medal. While attending Columbia University on the GI Bill, Ted met the love of his life Lois Goodell and shortly thereafter their 65 years of marriage began. Ted worked from 1946 – 1986 for the U.S. Geological Survey (USGS) and was recognized as one of the USGS' foremost experts on the preparation and review of reports. During his USGS tenure in Utah he became the leading expert on the Great Salt Lake. In 1984 he received the Meritorious Service Award of the U.S. Department of the Interior and in 2011 he was the recipient of the Lehi Hintze Award, established to recognize outstanding contributions to the understanding of Utah geology. Ted loved Lois above all else. Even in their golden years, the twinkle in his eyes and boyish grin would return when

he was with Lois. He liked dogs and tolerated cats, enjoyed smoking a good pipe, reading good books, raising houseplants, furniture making, all things Harry Potter, and the pursuit of knowledge. His thirst for knowledge and amazing memory were legendary. Ted was preceded in death by his parents and his brother. Lois and Ted are survived by their sons Dan Arnow (Mary) and Don Arnow (Ann), and 2 grandchildren. A Celebration of Ted and Lois' life was held on January 3, 2015 at South Valley Unitarian Universalist Society, Salt Lake City, UT. Please send condolences and memories to the family at:

"mailto:darnow@bridgepub.com" darnow@bridgepub.com.



Kenneth I. Darmer, Sr. (96), passed away on May 28, 2015, following a short illness. He was born on a farm in Mitchell, SD on August 2, 1918 to Frank Alvin Darmer and Ginevra (Smart) Darmer. In 1919 his family moved to another farm near Webster, WI, where he grew up. He graduated from the University of Wisconsin at Madison with a degree in civil engineering. Thereafter, he did surveying work at Portage, WI, and was an instructor of Railway Engineering at the University of Wisconsin before joining the U.S. Geological Survey for a 37-year career in Illinois, Mississippi, Washington, D.C., South Dakota and Albany, NY. Ken finally retired in 1976. After retiring he worked as a consultant for Charles T. Main International in Boston, MA on hydroelectric engineering projects in Nigeria, Morocco, Liberia, Panama, Ecuador, Iran and Korea. He also served on the Hudson River PCB Contamination Settlement Advisory Committee and was a life member of the American Society of Civil Engineers, serving a term as president of the Hudson-Mohawk Section. He was predeceased by his wife of 54 years, Kathryn Louise (Harper) Darmer, his parents; two sisters; and his eldest son. He is survived by his devoted companion, daughter-in-law, three sons, nine grandchildren, and, 15 great-grandchildren. In accordance with his wishes, Ken's remains have been donated to the Anatomical Gift Program of the Albany Medical College. Ken was a long-time (50+ years) and a founding member of the Delmar Presbyterian Church. A memorial service for family and friends was held at the Church on June 20, 2015, and a burial service for his ashes was held in Janesville, WI, at a later date.



Richard Fraser Duwelius, 65, passed on Friday morning May 29, 2015 after several months of ill health. Richard was born in 1950 and grew up near Terre Haute, Indiana. Many of the characteristics that would serve him later in life were formed from his parents -- persistence, an attention to detail in all things, love for gardening and the natural world. Richard was an avid and skilled woodworker, gardener, musician (piano and guitar) and lunchtime table tennis player. He spent his retirement years traveling and relaxing at home. He began his career as a Hydrologic Technician in the USGS, Indiana District in April 1977, then became a Hydrologist in 1984, and Assistant District Chief for Hydrologic Research in 1999. His name appears on many USGS data records as a driller, helper, data collector and sampler. Richard's early career with the USGS was highlighted by his contributions to regional hydrologic studies of ground-water resources, water quality in coal-mining regions, ground-water/surface-water interactions, and interpretations of ground-water flow and water quality relative to potential sources of contamination in central, northern, and northwestern Indiana. These were difficult studies, often involving drilling into and sampling ground water of dubious quality, long days, and difficult conditions; the studies demanded his full dedication, persistence and skills. Richard's foundational research is used today as the basis for actions to protect and improve water quality by Federal and State efforts to restore parts of the environment in Indiana. From 1999 to 2008, Richard supervised USGS interpretive hydrologic studies in Indiana, including his service as Acting Director of the Indiana Water Science Center in 2006. Richard's contributions to sound financial management of the USGS programs in Indiana, his role in completing complex negotiations with other agencies, and his technical and editorial improvement of USGS information products continue to benefit the Nation through the work done at that time. In his scientific, management, and personal life, Richard was a "rock;" providing strength, stability, dependability, and fairness upon which his friends and colleagues at one time or another had relied. He improved the quality of USGS scientific research in Indiana by outlining how that research was accomplished, how his ideas were implemented and how the fiscal soundness of the research projects allowed completion of that work. Richard said that his skills in writing, science, and attention to detail came in part from his father, Thomas, an engineer. He was preceded in death by the love of his life, Denise M. (High) Duwelius in 2007 after 30 years of marriage. Richard is mourned in his passing by his many friends and professional colleagues. He is survived by a brother and a sister; and his companion. His friends and colleagues mark his passing with sadness and with gratitude

for the time he also spent with his USGS family. Richard played the guitar and was a founding member of the "Lost Water Boys," a treasured presence at many USGS and water professional functions. His contribution to the Lost Water Boys anthem, titled "Shutdown" was about non-essential government employees during the 2011 Federal government closure (reprised in 2013). The anthem lives on through You Tube:

https://www.youtube.com/watch?v=42XjjsMfTFI&feature=youtube_gdata_player



Andrew 'Andy' Griscom, 86, a long-time U.S. Geological Survey (USGS) geophysicist, passed away on June 21, 2015 after a long battle with cancer. Andy was born on October 21, 1928 to Ludlow Griscom, a famous ornithologist and naturalist, and Edith S. Sloan in Boston, MA. He attended the Dexter School, Milton Academy (1945) and received a B.A. in geology from Harvard University (1949). After completing course work at Tufts University he then continued graduate work at Harvard University in 1976 with his PhD thesis on the bedrock geology of Maine. It was two decades earlier, however, that Andy began his life-long career at the USGS. Starting with a short stint in Washington, D.C., Andy soon transferred to the USGS in Menlo Park, CA, where he served until his retirement in 1998. As a student, and long before acceptance of the theory of continental drift, Andy was stimulated by the rapid development and confirmation of plate tectonics. Like many young scientists of his day, he was inspired to reassess past geological work in light of this new theory. At home and around the breakfast table, Andy energetically shared his enthusiasm with his family by sketching three-dimensional drawings of plate boundaries and faults, sometimes using a piece of toast and his hands to explain the subduction of ocean crust beneath the continents. He was internationally respected for his research using magnetism and gravity to reveal concealed geological structures, outline ore deposits, describe active fault zones, understand magma chambers, and reconstruct ancient plate movements. His early work on the San Andreas Fault in northern California still serves as a foundation for our understanding of earthquake hazards in California. One of his well-known publications on this subject has received 292 citations in the scientific literature. Andy's scientific expertise spanned the entire globe, with research projects in the Appalachian Mountains, Alaska, Oregon, Midwestern US, Puerto Rico, Virgin Islands, and Saudi Arabia. Andy was an outstanding technical writer, with a broad understanding of earth science. He mentored many up-and-coming scientists, and he was often sought out by experienced colleagues for his expert advice. Andy's colleagues in government and academia will greatly miss his counsel, experience, and outstanding contributions to earth science. Andy is survived by his wife, Shannon; two sisters; two children; five step-children; and, 17 grandchildren. A memorial service was held on June 28, 2015, in the Rambo Auditorium (Building 3, USGS, Menlo Park, CA).



David D. Harris, 89, passed away on March 11, 2015. David was born on April 6, 1925 in Portland, OR to Matthew and Bernice (Elliott) Harris. David graduated from Franklin High School in 1943. He joined the U.S. Marine Corp and in February of 1945, as a Staff Sergeant in the 11th Amphibian Battalion, he participated in the landing and assault on Iwo Jima. After the war, Dave graduated from Oregon State University and began working for the U.S. Geological Survey as a Hydrologist and was assigned to the Office in La Grande, OR. It was there he met Evelyn Hamilton and in 1953 they were married at Mt. Tabor Presbyterian Church in Portland. They had two daughters. After living in Albuquerque, NM, and Denver, CO they returned to Portland until Dave retired in 1983. David and Evelyn then moved to Neskowin on the Oregon Coast, where they made their home for 30 years. Dave is survived by his loving wife and best friend of 61 years, Evelyn (Evie); his two daughters; 4 grandchildren; and, 4 great grandchildren. A Family Service honoring Dave was held at Willamette National Cemetery, Portland, OR.



Marion Helmer, 89, passed away on July 1, 2015 in Tacoma, WA. She was born on April 19, 1926, in Gary, IN to Elizabeth and Nicholas Fiffles. She attended school in Tacoma and was a graduate of Stadium High School, after which she attended the University of Puget Sound, where she pledged Lambda Sigma Chi sorority (later Alpha Phi) and was also a member of Theta Rho. In 1946, Marion married the love of her life, Robert Helmer, and they were together for 57 wonderful and precious years until his death in 2003. Marion worked at the Pacific Naval Air Base in Lakewood, WA and several auto agencies in Tacoma before going to work for the US Geological Survey in Tacoma, where she served as an editorial assistant for 25 years. For the next 10

years, she and Robert commuted to Seattle daily to work at Helmers Auto Parts, a store owned by her husband. Marion is survived by two sons and a daughter, seven-grandchildren, and 10 great-grandchildren. She was preceded in death by her parents, her husband, Robert, and her son Robert Jr.

Carolyn E. Jordan, 79, (wife of retiree **Paul Jordan**) passed away on March 7, 2014, in Lawrence, KS. Carolyn was born December 9, 1934, in Omaha, NE, the daughter of Carrol and Lucille Roxberg. She graduated from Lincoln High School and the University of Nebraska in Lincoln, KS. She married Paul R. Jordan on June 10, 1955 in Lincoln, KS. She was a teacher, church worker, activity coordinator for a retirement community, musician, and church hand-bell choir director. She was a member of First Presbyterian Church, Kappa Delta sorority, Mu Phi Epsilon music sorority, PEO Sisterhood, and Lawrence Civic Choir. Carolyn is survived by her husband Paul; her four sons; six grandchildren; and, two great-grandchildren. A memorial service was held in April in Lawrence, KS.



Lola Jane Rose, 69, passed away on July 13, 2015 at her residence in Knoxville, MD. Born on August 19, 1945 in Purcellville, VA, she was the daughter of the late Louie Fletcher Milbourne and Georgie O. (North) Milbourne. She is survived by her loving husband of 51 years, Dennis; her mother; two daughters; a son; and five grandchildren. She was preceded in death by an infant son, two sisters, and four brothers. Services were held on July 17, 2015 at Eackles-Spencer & Norton Funeral Home, Harpers Ferry, WV. The family received friends at the funeral home on July 16, 2015.



Leah R. Sprague, 62, passed away on Tuesday December 23, 2014 at Maine General Medical Center in Augusta, ME. She was born in Casper, Wyoming on October 2, 1952. Leah grew up in Casper and graduated from Natrona County High School. She worked at several local businesses in the clerical field. In 2012 she relocated to Smithfield, ME and reunited with a friend from her youth, in WY, **Lee Lenfest**. Leah and Lee met in 1975 in the Casper Orchestra. They lost touch with each other for over 30 years after going their separate ways. Leah contacted Lee in 2011 through social media and after several months of correspondence, Lee was able to convince Leah to move to Maine. Leah was predeceased by her parents, Earl and Bonnie (Kerston) Sprague. She is survived by her loving companion, Lee Lenfest, her brother and her sister. Funeral arrangements were made with Knowlton and Hewins Funeral Home and Cremation Service, Augusta, ME. Memories, condolences, photos, and videos may be shared with Lee on the obituary page of our website at www.khfuneralhomes.com



Stanley E. Norris, 97, died April 6, 2015. He was born in Harrisburg, Ohio on February 6, 1918 and graduated from Grove City High School in 1935. He graduated from The Ohio State University with a degree in geology in 1939. Stan served in WWII as a First Lieutenant in the Army Air Corps, European theatre. After the war, Stan practiced hydrogeology with a career spanning 36 years with the US Geological Survey retiring in 1981, and 20 years in private consulting services. Known as "Mr. Groundwater", Stan was considered Ohio's preeminent hydrogeologist. He developed several fundamental concepts of groundwater occurrence and movement which formed the foundation of groundwater protection and management in Ohio. Mr. Norris was a prolific writer in his field with over 70 publications. He received many citations, among them the Mather Medal and induction into the Ohio Conservation Hall of Fame. He was most pleased with the award from his Washington DC colleagues in the US Geological Survey and the Geological Society of America recognizing his advancement of the field of Ohio hydrogeology. Stan is preceded in death by his wife of 70 years, Mary Jane Keller Norris, and is survived by his three sons and a daughter; 8 grandchildren; and, 8 great-grandchildren. The family received friends at the funeral home on Saturday, April 25, 2015, in Grove City, Ohio, and a private burial was held afterwards.

William Dory Pope, 67, of Hershey, PA passed away on June 18, 2015 at the Good Samaritan Hospital, Lebanon, PA. He was born on July 16, 1947 in Jacksonville, FL to the late William T. and Edith Pope. He was married for 46 years to Sandra L. (Swank) Pope on September 6, 1968. Mr. Pope started working for the U.S. Geological Survey (USGS), Water Resources Division office in New Cumberland, PA in the late 1970's. He

started as a Hydrologic Technician working in the Basic Data Section and later entered into the USGS Upward Mobility Program. In the early 1980's, he was converted to a Hydrologist and continued working in the Data Section until his retirement in the 1990's. As a Hydrologist working on data-records processing, he also worked on several scientific projects, including the installation of Data Collection Platforms for several rain-gauge stations in the Susquehanna Flood Forecast System-Improvement Project. Dory is survived by his wife, Sandra, a son and a daughter, four grandchildren, and a sister. A funeral service was held on June 24, 2015 at Rothemel-Finkenbinder Funeral Home & Crematorium in Palmyra, PA. A private interment was held by his family.

WRD RETIREES' STATE CONTACTS -- DUTIES

This information was recently sent to the WRD Retirees State Contacts: In response to requests about what duties are expected from WRD Retiree State Contacts, this statement has been prepared. We hope that it will help you to carry out a meaningful and rewarding program.

Get in touch with the Water Science Center (WSC) Director in your state. Give some background on the WRD Retirees, and send any pertinent information by email. Make sure the person knows we have a web site at <http://wrdretirees.org/>. Describe what we are doing for the hydrologic intern scholarship program, and that there is a summary in the November 2014 newsletter, available on the web site. You can find contact information for the WSC Directors at http://water.usgs.gov/key_officials.html.

Talk about how we are looking for new members from those recently retired, or indeed for affiliates from those currently employed. Ask to be informed about upcoming retirements. See what ideas you both can come up with to increase the retirees' membership.

Establish how WRD Retirees can answer any questions that come up. In addition to your own knowledge, refer to the national officers in Reston. You can consult with us at any time.

Try to find out what concerns the Director may have that we can help with. Don't make any promises yet, but tell them that we will discuss things and see what we can do to help. For example, we might set up a small work group to explore the matter, if it's just in that state.

If there is a local meeting and gathering nearby (see page 3 of the telephone directory) invite them to attend. For example, we often invite speakers from the USGS National Center to speak at the Reston-Herndon luncheon. See if that idea would work for your state.

If the WSC is not too far from your home, consider attending retirement parties given for those going into retirement. See if it's possible to provide enrollment forms to these people, in case they wish to join. Enrollment forms can be found on the web site, or you may download a one-pager from <https://drive.google.com/file/d/0B8FZ9WSEG7a2dDRWbEg5eFBMVGs/view?usp=sharing>

Make contact and stay in touch with members in your state. Try to promote local meetings and gatherings. Take the lead in helping to find members who do not reply to mailings or phone calls.

Sometimes various USGS water offices hold conferences in different cities at which we might be able to recruit new members. Either you or someone you know may wish to attend to represent WRD Retirees. If nobody can attend, consider using the one-pager above (two pages printed back-to-back) as a handout. If you cannot provide a supply to the conference organizer, contact the national office of WRD Retirees at wrdretirees2014@gmail.com, and we will print a supply for that particular conference.

You can report on progress quarterly in the newsletter using News of Retirees. Or, you may communicate with us anytime at the above email. In any case, we are interested in how this works for you, and to help you with any problems you encounter.

These are the basic ideas. Other things may arise depending on your geographical location. If questions come up, contact the office at wrdretirees2014@gmail.com, so we can explore the situation together. Sometimes we can find a solution together, other times not. We may have to consider each case on its own merits.

Tim Smith, President, WRD Retirees

RETURNED ENVELOPES

Over the past year we have had a large number of envelopes, containing the WRD Retirees Newsletters and/or Directories, returned to us due to wrong addresses and/or members moving. We have tried locating these members by name, address, and phone numbers with no success. We are now asking our members, our State and Regional Contacts, to help us locate these missing members. If you know the current mailing, phone, or email address information for an individual below, please send us an email with that information to:

wrdretirees2014@gmail.com

Please help us.

NE Region

Anderson, Henry W.	(90)	45800 Jona Dr., Apt 105, Sterling, VA 20165
Evaldi, Ronald D.	(11)	32 Thoroughbred Rd., Scott Depot, WV 25560
Knudsen, John C.	(10)	1909 F Rd., Bark River, MI 49807
Smith, Mrs. Earl L.	(W)	5 Stuart Rd., Barrington, NJ 03825-5416
Voytik, Mrs. Andrew	(W)	521 Laudermilch Rd., Hershey, PA 17033
Wolcott, Stephen W.	(11)	403 Derzee Ct., Delmar, NY 12054

SE Region

Bubeck, Robert C.	(97)	3240 SE 45 th St., Ocala, FL 34480-9309
Bowie, James B.	(80)	304 Country Club Drive, Piscayune, MS 39466
Callahan, Mrs. James	(W)	163 Chatham Circle, Jackson, MS 39206-3608
Edwards, Mrs. Melvin	(W)	4213 Marvin Place, Raleigh, NC 27609
Frye, Mrs. Prentis	(W)	389 Economy Circle, Dandridge, TN 37725-1272
Inman, Ernest J.	(00)	2472 Westhill Ct., Norcross, GA 30071
Peters, Norman E.	(10)	3923 Carriage House Lane, Duluth, GA 30096-5403
Simonds, Edward P.	(11)	705 Diane Circle, Casselberry, FL 32707
Voegile, Mrs. Renee	(W)	3343 W 44 th Terrace, Ocala, FL 34482-8337

CR Region

Albert, Mrs. Harold	(W)	2212 Glade Rd., Colleyville TX 76034
Brown, Helen	(W)	6128 S Iola Way, Englewood, CO 80111
Hodges, Richard E.	(03)	10290 N 55 th Lane, #204, Arvada, CO 80002
Hull, Stephen H.	(05)	226 S 29 th Street, Lincoln, NE 68510
Jordon, Paul R.	(94)	5121 Congressional Circle, Apt C 304, Lawrence, KS 66049-4742
Reed, Kathy	(09)	12307 W Aqueduct Drive, Littleton, CO 80127
Samsel, Theodore	(11)	1205 Ash St., Apt 29, Leawood, KS 66209-3107
Williams, Myrtle D.	(03)	12429 Schofield Farms Dr., Apt 125, Austin, TX 78758

WR Region

Dinehart, Randy E.	(10)	3933 Chariot Circle, Rescue, CA 9567
Gibbins, James J.	(10)	9855 West Rd., Redwood, CA 95470
Gonthier, Joseph B.	(90)	8325 S. Highland Dr., Apt 118, Sandy, UT 84093-1037
House, Jon G.	(11)	2994 Provincial St., Medford, OR 97504
Jensen, Mrs. Leon J.	(W)	1427 Forge Way, Draper, UT 84020-8835 DECEASED??
Laenen, Antonius	(95)	5732 NE Siskiyou St., Portland, OR 97213
Marvin, Catherine	(83)	Chateau Cupertino, Apt 121, 10150 Torre Ave., Cupertino, CA 95014
Vandruff, Doris A.	(92)	3080 S. Richmond St., Box 404, Salt Lake City, UT 84106

NEW MEMBERS

Crawford, Charles G. (15) (Teresa) **Affiliate** 1365 Cherry Tree Rd, Avon, IN 46123, 317-276-8269, ccrawford@indy.rr.com
Femmer, Suzanne (15) (Steve) 12903 County Rd, Rolla, MO 65401, (h) 573-364-0654, (C) 573-578-3520, stevesuzf@gmail.com
Frehs, Richard P. (15) (Jennifer) 6547 Winston Court West, Columbus, OH 43235, (c) 614-580-6816, rpfrehs5@yahoo.com
Kish, George R. (15) (Joanne) 15018 Meadowlake St, Odessa, FL 33556, (h) 813-920-0853 (c) 813-416-0899, gkish52@gmail.com
LeBlanc, Denis R. (15) (Denise) **Affiliate** 32 Paul Revere Rd, Acton, MA 01720, (h) 978-263-1612, (c) 978-501-3065, denis.leblanc@gmail.com

DIRECTORY CHANGES

Blanchard, Steve (11) 65 Elden, Maryborough Hill, Douglas, Cork, Ireland; cell 353-86-088-7152; landline 353-21-241-5028, spring.grove10@gmail.com – addr, phone
Boning, Charles (Bill) (94) Apt. 328; 571-442-8910, (c) 703-966-6162 -- apt no, phone
Driver, Nancy (10) P.O. Box 280353, Lakewood, CO 80228, 303-905-2988, kindred.coaching@gmail.com – addr, phone, email addr
Gerhart, Jim (10) 640 Dorset St., Lititz, PA 17543 – addr
Gissendanner, John (99) johnwgiss@gmail.com – email addr
Hansen, Bruce P (05) xtreeman222@comcast.net – email addr
Horowitz, Arthur J. 'Art' (11) 41 Pointe Terrace, S.E. Atlanta, GA 30339, 770-314-1958 – addr, phone
Koerke, Edward (12) e51koer@verizon.net – email addr
Martens, Lawrence 'Larry' (92) 415 Cook Springs Road Suite 131, Pell City, AL 35125 205-814-3131, lmartens1930@gmail.com – addr, phone, email addr
Pustay, Edward (02) pustayed@yahoo.com -- email addr
Slack, Larry (05) 601-724-1069 - phone
Straka, Darla E (03) Destraka@icloud.com ; 520-255-1138 -- email addr, phone
Tucci, Patrick (07) (s) Zelda -- wife
Walker, Patrick (85) 700 Port St., Apt. 238, Easton, MD 21601, 443-385-0814 – addr, phone
Ward, Jancie (08) 7392 Royal Country Down Dr. Windsor, CO 80550 -- addr
Weiss, Linda (14) 505-934-0804 – corrects year of retirement, phone (**see note below**)
Wilke, Katherine (Kathy) (98) kridgewilke@gmail.com email addr

NOTE: *Linda Weiss's information appears twice in the directory, on page 38 and 39. The address information is correct on page 38. The information reflected on page 39 is incorrect and should be deleted from the directory.*

American Water Resources Association (AWRA) Newsletter for June 2015

AWRA Annual Water Resources Conference

Grand Hyatt Denver, Denver, Colorado, Nov. 16-19, 2015.

<http://www.awra.org/meetings/Denver2015/registration.html>

See the web site for registration details.

Killing the Colorado

If you've been reading the recent media coverage about the unfolding water crisis in the West, you might think the sole cause is lack of rain, or something to do with climate change. But here's something you probably haven't read: This crisis is created by man; built over the last century with bad policy, arcane laws and willful ignorance to environmental red flags. That means there are things that can be done, right now, to fix it.

https://www.youtube.com/watch?v=5p3htqFb2T4&feature=youtu.be&utm_source=2015+June+Connections&utm_campaign=2015+June+Connections&utm_medium=email

Sustainable Waters Web Site

http://www.sustainablewaters.org/?utm_source=2015%20June%20Connections&utm_campaign=2015%20June%20Connections&utm_medium=email

USGS Sediment Data Portal

http://cida.usgs.gov/sediment/?utm_source=2015+June+Connections&utm_campaign=2015+June+Connections&utm_medium=email

Aqueduct Water Risks Portal

http://www.wri.org/our-work/project/aqueduct?utm_source=2015+June+Connections&utm_campaign=2015+June+Connections&utm_medium=email

Cognitive Biases and Other Human Challenges of Complex Systems Science¹

Pierre D. Glynn

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1. INTRODUCTION

The Oracle of Delphi was a religious institution that lasted for over 12 centuries (from at least 800 BCE to 400 CE): the Oracle, also known as the Priestess of Delphi or the Pythia (Fig. 1), served an important societal function. Questions were posed to her -- after careful triage and preparation by her priests and acolytes -- by select members of the community, those who could afford her services. Almost invariably, the answers provided were ambiguous and required translation or explanation by priests, after which they often still remained clouded by uncertainty. Part of the value of the Pythia came from the parsimony of her advice: she worked only during the nine warmest days of the year and her pronouncements were short. There was also significant financial cost to seeking advice, which added to its perceived value, as did the associated ritual processes. Importantly, the efforts required to frame and ask the right questions helped the consultants to the Pythia come up with some of the answers they sought.

The Oracle provides lessons that can help us address some of the human challenges associated with investigating and modelling complex systems, such as those hosting natural resources and our environment. The challenges considered primarily refer to the inherent human biases and heuristics (mental shortcuts for reasoning and problem solving) that affect human judgement and decisions, and that have the potential to affect the understanding and modeling of complex systems and the application of the science developed to policy decisions. A few of these biases are discussed here. *The recognition of our human biases and heuristics is essential to improving the conduct of science, and ultimately, the science-informed management of our resources and environments.* The biases and heuristics discussed here are inherent to *all* human beings, regardless of education, social position, or employment; as such they provide examples of what Francis Bacon called “the idols of the tribe” (Bacon, 1620).



Figure 1. Lessons from the Oracle? (John Collier, Britain, 1850 – 1934, Priestess of Delphi, 1891, London; Gift of the Rt. Honourable, the Earl of Kintore 1893, Art Gallery of South Australia, Adelaide; published here by permission).

¹ The present article is a shortened version of a proceedings paper ([Glynn, 2014](#)), which itself was derived from a more substantive article ([Glynn, 2015](#)). Both papers can be freely downloaded from the internet.

2 SOME LESSONS FROM THE ORACLE

Human judgement and decision-making reflect human evolutionary history and cultural development over thousands of generations, as well as individual experiences and modern social influences. Our conscious rational thinking, when employed (at significant energetic cost), can make use of experiences individually accumulated over years to decades. In contrast, our intuitive responses, our mental shortcuts and cognitive biases, are energetically less costly, and consequently, are predominant (Kahneman, 2011). They generally reflect human adaptation and rituals developed over millennia—at a time when human population was much lower (~ 50 to 300 million during the Oracle's time) than at present (~ 7 billion). Why is this relevant? First, because we have not *individually* experienced or incorporated into rational *conscious* thought, with the frequency of feedbacks required, the full array of ecosystem and social dynamics that have affected human survival and cultural development over our evolutionary past. Our intuitive judgments and actions, i.e. the “fast and frugal heuristics” described by Gerd Gigerenzer and his colleagues (Gigerenzer and Goldstein, 1996; Marewski et al., 2010), have conditioned us well to address the experiences that affected our *historical* survival and social fabric. Second, in part because of population growth, many factors affecting *present-day* natural resources and environments differ from those of the past, in intensity if not in character, and have *not* been incorporated into our intuitive adaptive responses. Energy-intensive, conscious, logical thinking is required for us to successfully meet our future. Integrated modeling and complex systems science can potentially help with this task, if it provides a structured framework for assembling, transforming and examining information related to the management of natural resources and environments. Our instinctive responses and actions may also be useful—especially if we can distinguish them, understand them, and possibly incorporate them, albeit consciously if possible, into our scientific processes and into our management actions.

Why is it important to assess the biases and heuristics that affect our reasoning, and therefore our investigations and modeling of complex systems? First, because complex systems science (and its application) typically involves multiple people with different backgrounds (e.g. technical experts, resource managers, regulators, members of the public) but with commonalities of thinking and reasoning. Second, because as Stanovich and West (2003) state: “people assess probabilities incorrectly, they display confirmation bias, they test hypotheses inefficiently, they violate the axioms of utility theory, they do not properly calibrate degrees of belief, they overproject their own opinions onto others, they display illogical framing effects, they uneconomically honor sunk costs, they allow prior knowledge to become implicated in deductive reasoning, and they display numerous other information processing biases”.

2.1 An Example: the “Visible is Credible” Bias

(Glynn, 2014) discuss four different biases that can affect the science (and modeling) of complex systems. The present article discusses only one of those biases.

John Collier (fig. 1) portrays the Pythia's expanded cognition, gained by closing her eyes. Why is that? One answer might be that vision is such an active sense that it may overwhelm our other cognitive inputs, and possibly also diminish our ability for conscious logical thought. Our senses include four other “classic” receptor senses (hearing, smell, taste, touch or skin sensation), as well as many other internal senses (e.g. balance, time, pain). Vision is a privileged sense that allows near-immediate human response to impactful events. It allows quick assessments of situations. People near us are able to immediately share our visual perceptions. In contrast, other senses (1) involve internal perceptions that are not as easily shared, and/or (2) are associated with greater transmittal delays between emission and reception of the sensory signal (e.g. hearing), and/or (3) require greater time for reception and human processing before action can be taken (e.g. smell). It is no coincidence that vision is a most important sense, especially when it comes to the shaping of human beliefs. “To see is to believe” is a common human expression. Conversely, the invisible requires a greater effort of belief, or of education, and consequently often ends up unrepresented in our mental models, in our conceptual models, and therefore in our numerical models. There are many examples of our *discounting* of important, yet relatively invisible, ecosystem processes or resources. These processes or resources may be “invisible” to us because: (1) they usually *are* invisible or out of sight (e.g.

groundwater, microbes), or (2) we *perceive* them as unchanging and therefore ignore them in our mental models (which tend to be transitory).

For example, lack of accounting of groundwater processes, and the regulation and management of groundwater and surface water resources as if they were separate resources, is a pervasive problem (Winter et al., 1999) that, according to Glennon (2002), has contributed to poor management of groundwater resources in several regions of the United States. Similarly, integrated environmental watershed models of water, sediment, and nutrient inputs to the Chesapeake Bay have, generally, represented groundwater processes only minimally. The models have not properly accounted for the large reservoir of nitrate in groundwater. Additionally, the models have generally not accounted for the decadal time scales of groundwater processes (Sanford and Pope, 2013), or for the decadal to millennial time scales of sediment processes (Pizzuto et al., 2014). As a result, the integrated environmental models for the Chesapeake Bay watershed have, for the most part, ignored the response times required for management or policy efforts to limit sediment and nutrient transport to the Bay. Like the Pythia, occasionally closing our eyes to the most obvious “visible” processes may help us open our minds and consider the less visible.

3 CONCLUDING THOUGHTS

Human biases affect the way we conduct complex systems science (including the modeling of those systems) and how we apply science for the improved management of natural resources and environments (Glynn, 2015, 2014). These biases often reflect some of the ways that we use to simplify and adapt to the complexity of Nature. I have several suggestions how we might address these biases in the study of complex systems.

The “behavioral biogeosciences”: a new area of study. Our conditioned simplified responses work well in some, but not in all, situations. We are not well adapted to address resource/environment issues that differ from those experienced in our human evolutionary past, and/or that have not provided frequent, sharply experienced feedbacks at the level of the individual, or of a local community. The behavioral sciences can help us understand the extent to which our biases are the result of our evolutionary adaptation to threats and opportunities. They can also tell us when those adaptations may not provide the best solutions to managing our ecosystems (including ourselves), perhaps because the temporal and spatial scales of reference, or the dynamics of change, are outside of our natural adaptive capabilities. Recognizing our human biases, and when they may interfere, or not, with science-informed management of natural resources and environments is critical. So is having an appropriate understanding of the biogeophysical and ecological processes, and their relevant time and spatial scales. Modeling and structured investigation and synthesis processes can provide tools to help us organize and maximize our knowledge of the biogeosciences, while also taking into explicit account our human needs, responses and biases.

Adaptive management: an approach for managing complexity and uncertainty. We cannot completely understand, describe and simulate complex dynamic systems. We need simple enough descriptions and processes that can be understood by a large community, so as to lead to reasonable management and policy actions. Adaptive management offers a potentially useful strategy for the management of our environment and its resources. It offers an iterative approach that depends on modeling and impact monitoring of management actions, and consequent revisions when needed (Williams and Brown, 2012). Adaptive management, however, is not a panacea suitable to all types of situations (Craig and Ruhl, 2013; Norton and Reckhow, 2008). Ethical reasons, and/or legal reasons, and/or lack of follow-through may prevent its application. Adaptive management may also fail in managing systems that have lagged or highly non-linear responses or that have threshold responses from which there may be no recovery.

Participatory modeling, structured community interactions, and “red-teaming”. Complex systems science must be simple enough to be understood and used by a broad community. Like the Oracle of Delphi, modeling and other structured investigation and synthesis processes must help motivated consultants, experts and members of the public alike, explore questions and possible answers in simple ways. The lessons that we can take from the Oracle or Pythia have limits, especially because of the number and diversity of people and stakeholder perspectives involved in the science of complex systems. Imagine a multi-headed multi-tranced Pythia speaking in a diversity of tongues to a

group of consultant parties with potentially adversarial perspectives...Effective solutions require that *all relevant* parties be heard (i.e. not just the ones bearing the richest gifts); and that *all relevant* heads of the Pythia be allowed to answer, but preferably intelligibly, intelligently, and with some coherence of thought and expression. Innate human behaviours, however, may make it difficult to determine what parties and/or what heads are most relevant, especially if the systems considered are complex and carry significant uncertainty. Simplification is required, as is the establishment of structured, transparent, processes enabling and recording community and expert interactions. Active cognizance of behavioural challenges and biases is essential. Vigorous testing is needed to compensate for our confirmation and constructionist biases. "Red-teaming", i.e. the establishment of innovative, independent, testing/challenging teams, offers one way to seek weaknesses and/or to possibly "destroy" constructed models, components or interpretations. Comparisons of process knowledge and predictions with monitoring data and observations from the past, and continuing into the future, are also critically important. This is especially true if we become aware of our behavioural biases in making observations and seeking data.

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