USGS RETIREES

NEWSLETTER No. 184
August 2019

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

PRESIDENT'S MESSAGE

Dear Fellow USGS Retirees,

Happy summer! It finally is hot and humid in the Twin Cities—a relative thing, I know, and most of you should not feel sorry for us in the northern Midwest. Your officers are not taking the summer off as we plan for the future of the organization. Downward trends in membership continues to be of concern. One focus of the strategic-plan objectives is to be more proactive in attracting new members. To accomplish this, we need to reach out to newly retired employees and retirees who "got away without joining". In addition to Affiliate members, we now have an Affiliate Liaison Member (Liaison) status. Liaisons are active employees who will work with our State Representatives by being our eyes and ears in each state office. We have recruited Liaisons in several states and are looking for others. We simply ask the Liaisons to promote our organization and to let us know who is retiring, and sadly, who has passed.

Your scholarship program for 2019 is complete and I am happy to announce that we are awarding scholarships to Taylor Dudunake, in Idaho, and to Sharon Mulready, in California. Details and pictures will follow in the fall newsletter.

Our officers have completed a draft strategic plan which is posted on our website. Your comments are always welcome. In addition, we have a group of volunteers, in Reston, who are documenting files, pictures, and videos. If you are interested in helping, please contact Dick Engberg or Herb Freiberger.

On a discouraging note, some of you received emails, requesting money for a third-party organization. Those messages did not come from me or from the organization. Please know that neither the president nor the organization, would ask you to contribute to a third party using an email.

As always, I want to thank our officers and staff volunteers for all they do to support our organization. There are several officer positions that we need to fill. Please let me know if you have interest in serving this organization. We are still in need of a Regional Director in the Northeast. In the good news department, Herb Freiberger has agreed to assist Dick Engberg with archiving. We are encouraging Herb to transition into the role of Archivist. Mark Anderson and Pete Anttila continue to plan for our next reunion that will be in Tucson. Our organization is limited only by the number of volunteers who get involved. I hope you enjoy reading this newsletter. Thanks for your support of this organization.

We always are seeking "News" from you for the next newsletter,

Jim Stark
stark@usgs.gov

Do I owe dues to USGS Retirees?

The year your dues have been paid through is included with your newsletter. If you receive a paper copy of the newsletter, the year is printed in the upper right of the mailing label. If you receive an electronic copy, you can find your name and the year in the file that is included in the transmission email. For example, if the year is 2014, you have paid for 2014 and you owe dues for 2015 through 2019 ($50). If the number is 2019, you are current with your dues.

Dues are $10 per year (great value) and can also be paid in advance. Make a check to USGS Retirees and mail it to "USGS Retirees, P.O. Box 280, Herndon, VA 20172-0280." Extra contributions are welcomed and appreciated, so indicate how much of your check is for dues and how much is a contribution. If you think an error has been made in recording your past dues payments, notify Kate Flynn at wrdretirees2014@gmail.com.

USGS RETIREES' REUNION – ARIZONA 2021

Plans are underway for the next reunion in Arizona. To optimize opportunities with costs, the committee is looking at March-April 2021. Mark Anderson is the Chairperson for the Local Area Committee (LAC), and Pat Tucci, Sandy Williamson and a few other have agreed to help. The current plan is to have the information regarding the reunion finalized and available in the February 2020 newsletter. If anyone is interested to assist, please reach out to Mark at markandersonwater@gmail.com or 605 390-9903.

A SCIENTIFIC NOTE

Keith Kirk writes: Here is an interesting article on the Powell expedition to map the Green and Colorado Rivers through the Grand Canyon to mark the 150-year anniversary of that expedition. I thought you might be interested. It was his scientific thinking that resulted in his resignation (fired) as Director of the USGS. He embraced the concept that water was a limited resource. Not politically correct at the time. https://eos.org/features/green-and-grand-john-wesley-powell-and-the-west-that-wasnt

NEWS OF RETIREES

Ronnie Andreani writes: To all the officers and newsletter staff – Thank You. Your efforts are greatly appreciated.

Pete Anttila writes: The first half of 2019 has been eventful for me. Prior to this year, I've been fortunate not to have any major medical issues. That changed when I started having difficulties digesting food. An endoscopy in January showed a large blockage in the lower third of my esophagus. A biopsy confirmed the blockage mass was cancer. I was referred to an oncologist who recommended chemotherapy and radiation treatments instead of surgery so that I could retain a viable quality of life. CT and PET scans identified the cancer was totally located in the esophagus. Subsequently, I began 6 weeks of chemotherapy (once a week) and radiation (five per week) treatments for 6 weeks. My last week of treatments coincided with the end of our 4-months stay in Indian Shores, FL. The main side effect of the treatments was a substantial loss of hair. About the second week back in Tennessee, I began to lose energy, experienced coughing spells, and had periodic high body temperatures. Medications prescribed by my family physician and an oncologist were not effective. A CT scan taken at the end of April revealed blood clots in my lungs. I was immediately hospitalized and applied intravenously with a blood thinner. According to the doctors, the clotting resulted from chemotherapy thickening the blood. Clots were detected in both my legs and determined to be the source of the clots in the lungs. A screen was inserted to stop the migration of the clots. I was released from the hospital after 4 days when the application of blood thinner changed to oral pills. I gradually started to regain my strength, stopped coughing, and had normal body temperature. On the last Tuesday of May I had an endoscopy. To my relief and utter delight, the doctor couldn't find anything for biopsy. The esophagus was completely clear and hopefully will stay cancer free. I probably will need to have periodic scans and take blood thinner pills the rest of my days, helping me enjoy each day with a viable quality of life.

Jim and Merilee Bennett write: On May 31st, we caught a connecting flight at the Dulles Airport to Paris and had the privilege of flying with 20 WWII vets going to the 75th Anniversary of the Normandy Beach landing – their ages ranged from 91 to 99. The USO and the Honor Flight programs covered all costs (flight and room and board), decorated the flight gate with individual posters of each vet in their uniform with a bio of their war service, and provided beverages and cookies. It was wonderful, awe-inspiring and humbling to be on the same flight and to have an opportunity to talk with therm. The reception by airport staff, those of us on the same flight and the crew of our airplane were overwhelming.

Denny Cline writes: I have been a caretaker for my wheelchair bound wife Dorothy until August 2018 when it became impossible for me to do, so we moved into an assisted living facility. Unfortunately, after a few months Dorothy developed dementia and had to be moved to a memory care center in January 219. She has

Alzheimer's disease, I moved back into our house, which fortunately I had not sold. I spend much of every day with her and take her to doctor appointments.

Terry Danielson writes: Time goes by so quickly it is easy to get behind. Thanks for the work each of you do and thanks for the updates from you all. If anyone is in our area at any time you are always welcome to stop by.

L J. Dantin writes: For the past five years it has been an up and down situation. Earline has had health problems – gall bladder surgery and breast cancer. At the age of 84, I am the care giver and in good health.

Norm Dion writes: On March 18, 2017 Dee Molenaar was selected as a recipient of the Mountaineers Lifetime Achievement Award, which is awarded annually to a member of The Mountaineers community for their lifetime of contributions to the outdoor community. A little more than 2 years later, Jim Wickwire and Tom Vogl (Two of Dee's climbing buddies) presented the award to Dee just a few weeks before his 101st birthday on June 6, 2019 at his home in Bow, WA as shown in the photo left:

Mary Dunn writes: I am happy to report our luncheon group is thriving – thanks to all the retirees from the 'Georgia District Office' and Brian McCallum encouraging them to join the retirees' group. Also enjoy reading the newsletter. Thanks for all the work the staff puts into it.

Jody Eimers' writes: I'm loving retirement. I'm on call to babysit for my 2-year old granddaughter; I started a business making and selling ceramic art; I serve on the Orange Water and Sewer Authority Board of Directors; and, I serve as the Orange County Commission for the Environment. Best of all, I no longer have to explain Trump to international partners. Look me up when you're in the Durham, Chapel Hill area.

Kate Flynn writes: I received an article from Nancy Rybicki, with the following handwritten comment: "I can't wait to truly retire, but in the meantime, I'm trying to alert folks about Water Chestnut. Please look for it in ponds and water bodies in Reston. Nancy" Please reference the article at (you will need to scroll down to the article):
https://www.researchgate.net/publication/332233733_Trapped_Again_A_New_Species_of_Water_Chestnut_Discovered_in_the_Potomac_River_httpmdinvasivesorgiotmjune-2018

Charles Gamble writes: It seems I usually let the new year slip by (must be age related)! Hope to have more news for you in a couples of months (new address, etc.). I'll try to remember. Thanks for the newsletter and the directory to those who work hard to keep them coming.

David Grason writes: I feel it is about time for to let my USGS friends know that Holly and are still alive and well here on Whidbey Island, and to express my appreciation to all of you who keep the retirees' group going, despite dwindling numbers. After 7 ½ years of retirement I see more clearly than ever what a special place the USGS was to work and what special people worked there (still do, I hope). Holly and I still run our one-suite B&B (The Tremont Suite) here in Coupeville, but it certainly doesn't take up all our time. Plenty of volunteer opportunities here to keep us both busy and we make trips several times a year back East to see children and grandchildren, friends, and relatives. I don't do Facebook, or any social media for that matter, but if anyone wanted to contact me and swap yarns about the good old days my email address is: dgrason801@gmail.com

Mark Hamill writes: Since I retired in 2015, I've been leading an active retirement. First step was to sell the house and move into a new one in Florence, Massachusetts. Check! It's a 55+ community of single-family houses, mostly with people like him from out of the area, chock full of professionals, mostly retired. Second was to do a lot more travel. Check! Vacations since retirement included a 2-week trip to Ecuador and the

Galapagos Islands in January, and a 15-day Central American cruise from Fort Lauderdale to San Diego with many a field trip and Mayan ruin in between. He also attended two USGS reunions. Mark stays active: walking or riding his bike daily, but also doing some teaching at a local community college and consulting from home. Most recently he started a local coalition to create a municipal broadband network for the city of Northampton. We're making slow but steady progress on that and look forward (we hope) in a few years to enjoying world-class Internet speeds at much lower prices than what Comcast is charging.

Jack Kume writes: Since my retirement from the USGS, I have been a volunteer Chaplain for the past 22 years at Post #153 American Legion, Olathe, KS. I have done many hundreds of chapel and graveside funerals for veterans. I have been an active volunteer for my church, Noon Lions Club, and the Johnson County Extension Master Gardeners.

Jerry Lindholm writes: Thanks for the good work you do. Do you suppose Trump cares?

Bruce Lloyd writes: I'm not sure you remember me (note was addressed to Celso), but I remember you fondly' We had some good conversation when I would visit Reston headquarters. Also, we went to one or more USGS-WRD-sponsored schools together' Hope you are doing well and enjoying your retirement. Charlotte and I are doing pretty well for old folks, and we are certainly enjoying ours. we have three "kids" that are all doing well and have been working for about 25 years or so. They are not too far from retirement. It is hard to believe how time flies when you are having fun. I am enclosing a check to cover whatever back dues I owe. Please use the rest (if any is left) to cover future dues. Thanks. Best regards to You and Yours.

Ken Markham writes: I enjoy the newsletter although I'm recognizing more names on the memorials page and fewer on the current entries. My wife does the newsletter for our local NARFE chapter so I can imagine the challenges WRDs team must face. So far it has been a good 23 years since retirement. Three cruises, one to Alaska, one up the east coast to Canada and one from Australia to New Zealand. We also have an interest in a timeshare and manage to get to Hawaii most years. I worked a couple summers for the Sonoma County Ag Commissioners office trapping insects and sugar testing grapes at a local winery during harvest time. Later I worked directly for the winery which was a better deal since I could take advantage of the 50% off prices. Also, volunteered working records for my old office for a couple of years.

Mike Nolan writes: The dissolution of both the Regional Hydrologist Office and the National Research Program coupled with the death of John Conomos have made it hard to maintain regular gatherings of retired WRD employees, or even active USGS employees who use to be WRD employees, in the Menlo Park area. This makes me especially appreciative of work done by the USGS Retirees Organization. Despite the lack of regular gatherings of retired Water Resources employees, I still have some contact with active and retired USGS folks. I'm fortunate to be able to ride bicycles regularly with Keith Prince and Brian Cole (see photo from a recent ride past Steven Creek Reservoir). My wife, Julie, still works for the Volcanic Hazards Program, so I'm able to keep tabs on broad USGS issues through her. Contact with Julie's group is especially encouraging because it provides a chance to meet young Postdoc's and new permanent employees her Volcanic Hazards Program attracts. This past winter was wet up and down California. We had many rainy days in the Bay Area and I often thought of the dedicated hydrographers who were undoubtedly out there maintaining gages and ratings both day and night. I found myself hoping they had the resources they needed to do their job well. I feel fortunate to still be able to log a fair number of miles on my bike, both in the Bay Area and in other places around the country. I do a little volunteer work for the Peninsula Open Space Trust, which is an amazing organization that has preserved tens of thousands of acres of open space in the Bay Area. I do a little woodworking and try to keep our house in shape. While working at Mt. St. Helens in 1980 I acquired a sourdough starter from Bobbi Meyers. At the time I was told the starter was a split from starter used by miners during the Alaska gold rush in the 1890s. I still have that starter and use it regularly to make bread. Julie and I make several trips a year to visit our daughter in Williamsburg, VA and our son, his wife and their young daughter in San Diego.

Jerry Pascale writes: Hi Celso – It's been a long, long time. I hope everything is good for you, Maria and family. Things here in Pensacola are OK, but a little lonely with my loss of Janet. It's been 10 months but seems like yesterday. I would like to thank you and your colleagues for doing a great job, keeping what's left of our old WRD together. Doing a thankless job, but you all are appreciated. We all know that it's not an easy job doing what you all do so well. Thanks

Gary Paulachok writes: Greetings from the Pocono Mountains! Spring is in full bloom, a welcome change from the generally dreary winter just passed. I would like to send a 'shout out' to my good friend and former District Chief Herb Freiberger. His continued commitment to all things WRD is truly an inspiration. I believe we owe him a debt of gratitude for his tireless efforts on behalf of our Retirees. I only wish I had Herb's energy! Best wishes to all our members for happy, healthy, and rewarding retirement adventures.

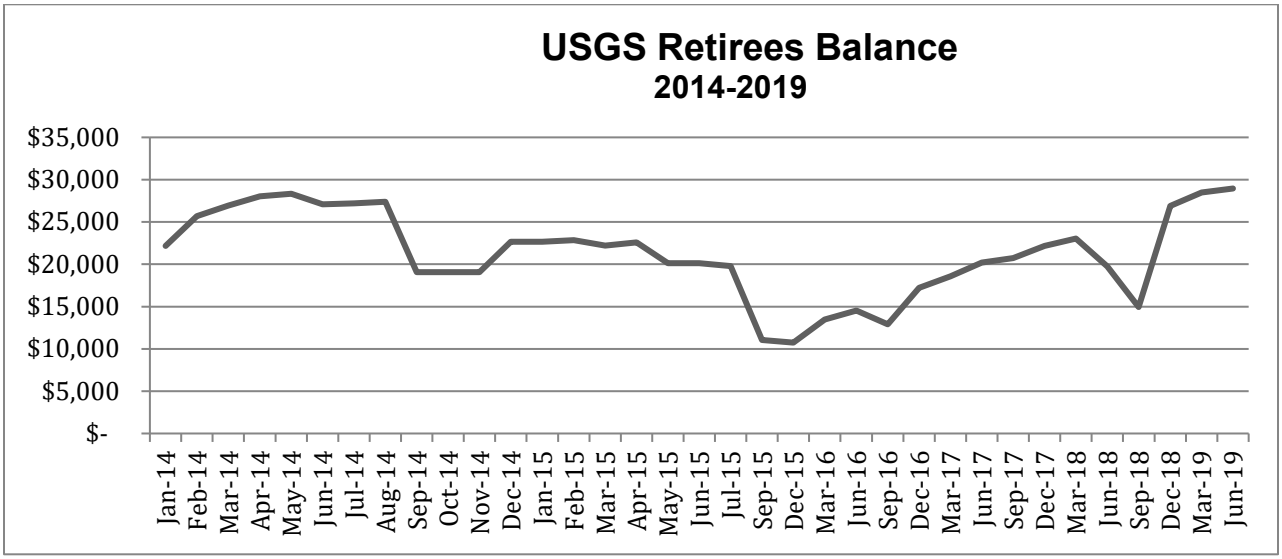
Dues Received since last May Newsletter:

Veronica (Ronnie) Andreani
David Anning
Melanie Clark
Denny Cline
Terry Danielson
L.J. Dantin
Mary Dunn
Pat Edelmann
Jody Eimers
Sandra Embrey
Charles Gamble
Julie Graf
David Grason
Jerry Lindholm
Ken Markham
Niel Plummer
Kathleen Miller
Mike Nolan
John Oberg
Gary Paulachok
Theresa Rose
Richard Wager
John Zogorski

TREASURER'S REPORT, SECOND QUARTER 2019

Treasurer Cathy Hill reports the organization had $28,956 at the end of the second quarter, June 30, 2019. Expenses this quarter included the printing of the 2019 Directory and the last Newsletter. The annual registration to the State Corporation Commission has been filed.

Special thanks for contributions above dues to Lloyd and Charlotte Orville. Many thanks for your generosity.



MEETINGS AND GATHERINGS

USGS RETIREES AND CURRENT EMPLOYEES LUNCHEON – GA
June 26, 2019

Attendees (L to R) Front: John Clarke, Mary Dunn, Ed Martin, Bob Pierce
Back: Michael Peck, Mark Landers (active), Keith McFadden, Brian McCallum (active)

USGS RETIREES – MN
ST. PAUL, MN MONTHLY BREAKFAST
May 6, 2019

Enjoying some Denny's Slams at the monthly St. Paul Retirees breakfast are, beginning on the left: Mark Have, Greg Stratton, Jim Ruhl, Charlie Smith, Dave Anderson, and Al Arntson.

USGS RETIREES, SPOUSES AND GUEST
SPRING LUNCHEON
Raleigh, NC
MAY 9, 2019

FIRST ROW (SEATED – L to R): Kay Naugle, Nancy Coble, Charles Daniel, Myra Daniel
SECOND ROW (L to R): William Robbins, Jeanne Robbins, Shirley Lea, Ron Coble, Tim Spruill, Rose Pinnix, Charlotte Lloyd, Bruce Lloyd, Rose Mary Lunsford, Nelson Williams, Nancy Garrett, Gary Garrett
EVERYONE HAD A GOOD TIME. WE PLAN TO MEET AGAIN IN OCTOBER 2019.

OHIO RETIREES' LUNCHEON
Semi-Annual Lunch
April 9, 2019

We had some new people join us.
L to R: Allison Kunze, Janet Welday, Rick Jones, Steve and Sandy Hindall, Rich Frehs, Kevin Metzker, Karen Dickson, Jim Morris.
The photographer missed Denise Dumouchelle (sorry Denise) but we have her arm in the photo. Our next lunch will be October 8, 2019 if you would like to join.

RESTON-HERNDON RETIREES' LUNCHEON
Reston, VA
May 6, 2019

Dick Engberg introducing Sarah Marshall, PhD student at Flinders University in Australia. She spoke on "Understanding Ground Water Drawdown in Complex Mining Environments"

2018 SCHOLARSHIP AWARDEE – THANK YOU

Holly Eschenburg writes: Dear USGS Retirees:
I have worked as a Hydrologic Technician at the Oklahoma Water Science Center for 2 years and 5 months. I love my job. The majority of my work is water-quality sample collection and continuous monitors, but I also have opportunities to shout levels, manage groundwater wells, and assist with ADCP measurements.
I plan to continue to work in hydrology for the USGS and aspire to become a Hydrologist, so I enrolled in Engineering Physics I in January of 2018. I was so exited when I heard about the Retirees' scholarship and am so-so grateful that you awarded me a scholarship in June of 2018. That scholarship covered my whole semester.
I am happy to report to you that I enrolled in and passed Engineering Physics II during Fall2018, that I survived the government shutdown, and that my supervisor just recently told me that they are looking into converting me to Hydrologist. Thank you USGS Retirees! Thank you for your support. I should hopefully be converted to Hydrologist soon. I will continue to take on more advance water-quality duties, and I also hope to take on surface-water duties as well. For the love of water, much appreciation.

RETIREMENTS

Donald 'Don' Bills retired on May 15, 2019 exactly 41 years **to the day** since he started as a Hydrologic Technician in the Water Resources Division, Flagstaff Arizona Project Office and the time has come for Don to hang up the wading rod, steel tape, e-tape, hand auger, GPR, QW multi-probe, driller's logs, hand lens, and laptop. Don began his career on May 15, 1978 as a Hydrologic Technician in the Water Resources Division, Flagstaff Project Office after graduating from Chico State with a BS in physical science. His career arc has spanned basic data collection and processing of surface-water, water-quality, sediment, and groundwater data with a transition into project work that included groundwater assessments, water well development, surface-water and groundwater interactions, and hydrothermal studies. Don converted to hydrologist in 1983 and was involved with the original Grand Canyon Environmental Studies working as one of the lead hydrologists training about 24 hydrologic technicians to conduct streamflow measurements in Grand Canyon. Don originated and lead the Grand Canyon Uranium studies earning a 2009 Regional Director's Award. Don's recent works include regional groundwater flow and contaminant hydrology of the Grand Canyon watershed, geohydrology of large regional flow systems in Northern Arizona, and groundwater-resources assessment and development support for Tribal Lands in Northern Arizona. He has authored and co-authored over 70 technical reports and articles on the hydrology, hydrogeology, and water chemistry of Northern Arizona and in doing so cemented a reputation as one of the most knowledgeable in the hydrologic community about Northern Arizona hydrology. He's also provided teaching support to Northern Arizona University for watershed hydrology and hydrogeology. Don is a lifetime member of the Arizona Hydrological Society and a founding member of the Flagstaff Chapter. Working with the Coconino Plateau Water Advisory Council and Water Partnership, Don has helped develop a water ethic standard for Northern Arizona, one of the first areas in the country to do so. He was also part of a team of scientists that developed criteria for determining At-Risk Waters in Northern Arizona. Don has given generously of his time to better the hydrologic community of Northern Arizona and continues to serve as Emeritus for advice and consultation related to Colorado Plateau groundwater and water issues within the USGS and in the cooperator community. We congratulate Don on an exceptional career and look forward to continuing to work with him while Emeritus.

Paul Capel retired on May 29, 2019. Paul started his career with the USGS in the Office of Water Quality in 1988, after completing a post-doctoral research fellowship in environmental chemistry at the Swiss Federal Institute for Water Resources. In the first years of his career, he worked on early planning efforts for NAWQA including design of the fixed site network and sampling protocols. He also developed and taught short courses at the National Training Center (Water Quality Principles, Environmental Processing of Organic Chemicals) and on interpretation of data from the NASQAN program. He then joined the NAWQA Pesticide Synthesis Team where he co-authored three books in the series "Pesticides in the Hydrologic System," interpreted NAWQA pesticide data, and conducted studies of pesticides in the atmosphere. In NAWQA Cycle II, Paul was the team lead for the "Agricultural Chemicals Team (ACT)". The team conducted integrative watershed-scale studies of nutrients and pesticides at eight locations across the Nation which resulted in the Circular 1433 "Agriculture— A River Runs Through it — The Connections Between Agriculture and Water Quality" as well as numerous journal articles. During NAWQA Cycle 3, Paul has been the team lead for the "Integrated Watershed Studies (IWS)" project which developed tools for the integration of groundwater and watershed models and the interpretation of high-frequency water-quality data. The team is also developing approaches to hindcast and forecast nitrogen fluxes to assess water quality in the Chesapeake Bay watershed; this work will result in the forthcoming circular "Nitrogen in the Chesapeake Bay Watershed: A Century of Change, 1950-2050." Paul says that it has been a privilege to work with great USGS folks across the country on some important and fun research over the past few decades. He has enjoyed studying some very large hydrologic systems (Great Lakes, Rhine River, Mississippi River, regional atmosphere, Chesapeake Bay watershed) and some very small ones (DR-2 in Washington and the Southfork of the Iowa River near Blairsburg, Iowa). All of us who have known and worked with Paul have enjoyed his friendship and sense of humor. His connections to the University brought many talented students to become employees of the USGS.

In the future, Paul looks forward to having time to travel, hang out with his family, teach at the University of Minnesota, and pursue some hobbies. He will continue as an emeritus scientist to work with the USGS International Program and finish off some of his current research.

Michael 'Mike' Dettinger retired on May 31, 2019 after nearly 38 years of service with the USGS. Mike started with the USGS in the Carson City, NV District office in 1981, as a groundwater hydrologist and then Groundwater Specialist. In those roles, through the 1980s, he explored hydrology in the Great Basin. He learned from great scientists, designed and helped install hydrologic networks, and conducted modeling and water-budget studies. In 1990, he was accepted into the Water Resources Division's Graduate School Program. He studied at UCLA in the Department of Atmospheric Science, from where he obtained his PhD in 1997. By 1992, he had relocated to the San Diego Project Office of the California District, and had begun research assessing and studying: (1) present-day and potential climate-change impacts in the West, (2) the predictability of streamflows from weather models, El Nino and Pacific Decadal modes of climate variability, and (3) pioneering studies of the nature and impacts of atmospheric-river storms, among other topics. The latter studies started after Mike joined the National Research Program (NRP) in 2001. In addition to his collaborations with his USGS colleagues in the NRP and in Water Science Centers, Mike also developed close collaborations with Dan Cayan and colleagues at the Scripps Institution of Oceanography, with scientists in NOAA and USACE, and with many colleagues in universities and state agencies. Mike returned to Nevada four years ago to work with colleagues in the Nevada Water Science Center and at University of Nevada Reno. Mike is a USGS Senior Scientist, and a Fellow of both the American Geophysical Union and the American Association for the Advancement of Science. He has authored or co-authored 150 journal articles and book chapters, and 30 government reports, but is proudest of the fact that his work has provided foundations for work done by many other scientists over the years, with >22,500 citations to his work in the scientific literature. Additionally, Mike and his colleagues have a major reference book on the science of atmospheric rivers coming out from Springer Nature later this summer. In retirement, Mike expects to continue his collaborations on several hydroclimatic and climatic issues - but hopefully at a little more leisurely pace and with a more local focus. He will remain in his beloved eastern Sierra and Great Basin landscapes, and the best places to look for him will be on trails around the area. He will be working with old and new friends from Scripps and around Northern California and Nevada. Following approval to do so, Mike plans to continue contributing to the USGS (and the WMA) as an Emeritus Scientist.

Wendy McPherson retired after 31+ years of service with the U.S. Geological Survey on April 30, 2019. Wendy started her career with the USGS in 1987 at the New York Water Science Center (NYWSC), Ithaca Program Office, after earning college degrees in Geology and Geography. While at the New York Office, Wendy was involved with database work and managed several groundwater projects. As part of her work for the NYWSC, she adapted the RTMap program, which was a real-time precursor to NWISWeb for displaying data on the internet. Wendy moved to the MD-DE-DC Water Science Center in 1999 and immediately became involved with issues related to a drought that started that same year and became much worse by 2002. Groundwater and streamflow levels broke the records set during the historic droughts in the 1930's and 1960's. Wendy kept her involvement with water conditions in Maryland by authoring the Maryland Water Conditions Summary, which provides a synopsis of discharge in streams, groundwater levels and precipitation at select locations. Wendy has been involved with the MD-DE-DC Water Use Program since 2005 contributing to multiple compilations and database activities. For the past two years, Wendy was the Project Manager for the Anacostia Groundwater Project and was working on a report about the Patuxent Aquifer. Wendy also served as the communications and outreach coordinator during her tenure in the MD-DE-DC WSC. In retirement, Wendy will be working to become a certified vegan lifestyle coach and will be promoting her DineKind Harford Healthy Living Foundation. We wish Wendy the best in her retirement and thank her for her service to the USGS.

Recent Picture of Mike Meyer at San Francisco Bay

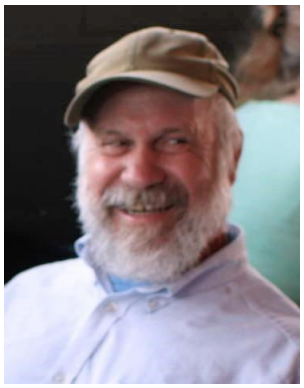
Mike Meyer, Research Geochemist par excellence, is retiring from USGS on April 30, 2019 after 35+ years of federal service. Mike began his exceptional career with USGS in August 1988 as a PhD student with the Organic Geochemistry Research Laboratory (OGRL) in Lawrence Kansas. He transferred to North Carolina WSC in 1995 and again in 2000 to manage the Ocala field supply Unit and laboratory. Mike returned to the KS WSC as the Director of the OGRL in 2003. Mike's career has been marked by many substantial contributions to USGS science as a research hydrologist. Mike's geochemical expertise has provided new knowledge of the occurrence, fate, and transport of organic contaminants and their degradation products in the environment. He and his team developed innovative analytical methods and applications to study the behavior of new and understudied organic contaminants such as pesticides, antibiotics, natural and synthetic steroidal compounds, and "inert" ingredients in pesticide formulations in the environment. Mike initiated and participated in numerous laboratories, watershed, regional, and national-scale studies of selected organic contaminants in surface and ground water. Mike's research demonstrated that antibiotics are transported into surface and ground water from both urban and agricultural sources. His collaborative efforts with a team of USGS scientists provided the first published documentation on the national occurrence of a wide variety of hormones, pharmaceutical, personal care products, and other wastewater contaminants that are released into surface water throughout the United States. In 2003, the authors of this paper received the U.S. Geological Survey Shoemaker Communication Award – this paper is also one of the most highly cited papers in the journal Environmental Science and Technology. In another collaborative paper, Mike also received the Rudolf Hering Medal for most significant paper in environmental engineering. Collectively, these studies have had a significant impact on understanding the occurrence, fate, and geochemical transport processes of organic compounds that are not routinely measured. In 2014 and 2015, Dr. Meyer was highlighted as a Thomson Reuters Highly Cited Researcher, in ranking among the top 1 percent of researchers for most cited documents, in their specific field (Environment/Ecology). In 2016, Mike received the Department of Interior Distinguished Service Award from Secretary Jewell in recognition of his many scientific accomplishments as a public servant. Quite a successful list of accomplishments! We thank Mike for his many contributions and friendship through the years and wish him well in his retirement career. We plan to have Mike return as a Scientist Emeritus to continue his love of science. Mike plans to have lots of fun in his retirement traveling to his cabins in Colorado and Minnesota, working on house/cabin projects, and hopefully some well-earned relaxation.

-Andrew C. Ziegler, Director, USGS Kansas Water Science Center

Laurence G. 'Larry' Miller retired on April 27, 2019 after 35 years of service with USGS, almost entirely within the National Research Program (NRP). He began his 50-year career in Oceanography with undergraduate studies and geochemistry research in New York, followed by graduate school in southern California. Larry was lured from Seattle in 1984 to work on Ron Oremland's Microbial Biogeochemistry project in Menlo Park. He enthusiastically supported Ron and others on the project and obtained entry into RGE within a few years. He made primary contributions to studies of nitrogen and carbon cycling in San Francisco Bay and Mono Lake, California. While his work at Mono Lake continues to this day, Larry also participated in field campaigns to Lake Fryxell in the Antarctic Dry Valleys as well as numerous forays to alkaline saline lakes in Nevada, California, and eastern Washington. Larry focused his mid-career on developing tools and methods to study methyl halide cycling in soil and aquatic environments. His novel efforts to couple stable carbon isotope fractionation studies with microbial and molecular biological techniques resulted in 20 publications, and 2 patents for USGS. All the while, Larry maintained his adjunct role in studies of selenium, mercury, and arsenic cycling, adding insight and unique capabilities to project studies. Larry's efforts over the past decade have focused on studies of acetylene fermentation by bacteria in water, soil, and sediment; chromium cycling in contaminated groundwater; and linking methane oxidation with perchlorate reduction. A self-professed late bloomer, Larry has over 65 career publications. Along the way he benefited from outstanding collaborations, particularly with Ron Oremland and others working on the project. He fondly recalls the 6 years he served NRP management as Research Advisor of the Ecology subdiscipline. Going forward, Larry continues to mentor younger associates and guide USGS science by participating as Emeritus Scientist with the Water Mission Area. He maintains a lead role in studies with colleagues in the California Water Science Center and in the USGS GMEG Science Center. His work includes evaluating the permanency of chromium sequestration during

in-situ remediation of contaminated groundwater. Larry also plans to continue research at Mono Lake by helping coordinate and teach the International Geobiology Summer Field Course. Other than that, Larry's retirement goals are to surf more, go sailing, and to enjoy life with his partner.

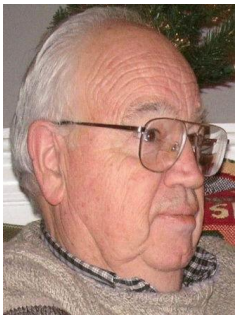
Kim Rogers retired after 41 years of Federal Service. It is a pleasure to recognize Kim's significant contributions and outstanding service throughout her years at the USGS upon her retirement on May 18, 2019. Kim entered Federal Service in December 1977 as a Clerk Typist GS-3 with the National Mapping Division in Alexandria where she assisted in the distribution of the U. S. Geological Survey (USGS) printed publications. In June 1983, Kim accepted a position with the Water Resources Division (WRD) into an Upward Mobility Program. During this time, she worked with programmers who were automating the DIPS Payroll system into the newly developing Administrative Financial Management System (AFiMS) system. She was converted to a Programmer in August 1985 and was the key contact person for 4 data bases (Time & Attendance, Personnel, Report Tracking and Planning) within the AFiMS system. In mid-1987, Kim became the lead programmer on the Career Documentation Profile (CDP) system that was migrated from the Amdahl to the Prime Mini-Computers and tied into the AFiMS Personnel database. This software was released nationally to some 60 Prime sites in January 1989 for use by all levels of WRD employees. For her efforts on the CDP project she received an Outstanding Performance Rating, Superior Service Award and Special Achievement Award in the spring of 1989. In 1990 AFiMS was replaced by the Administrative Information System (AIS) and Kim continued providing Customer Support to the Water community. With the selection of the Budget and Science Information System (BASIS) as the USGS financial system in 2001, Kim transferred to the National Water Information System (NWIS) and has continued providing exceptional National customer support, serving as the NWIS Webmaster, handles logistics for testing and travel along with Lotus and Gmail advice and support. Her willingness to provide support where needed has been a major asset of the NWIS program. Kim has served the majority of her 41.5 years of Federal Service in Reston working on the 5th floor for the now Water Mission Area. During that time Kim has seen and adapted to many changes throughout her career, always keeping Customer Support at the forefront. Kim plans on spending more time with her family and to travel more.



William J. 'Bill' Wolfe, Deputy Director of the Lower Mississippi-Gulf Water Science Center (Nashville Office), retired from the USGS after 30 years of service on May 31, 2019. Although he gave us plenty of notice, Bill began his USGS career in 1989 as a student volunteer in Puerto Rico, providing field assistance to a landslide study, and joined the Tennessee District as a Hydrologist the following Spring. As a project hydrologist, Bill was principal or co-principal investigator on a wide range of investigations, including studies of flood-plain sedimentation, land-use effects on reservoir filling, channel and stream-bank stability, behavior of DNAPLs in karst aquifers, and interactions among vegetation, hydrology, and geomorphic features and processes in small, isolated (insular) ecosystems. In 2007, Bill was selected as Surface-Water Studies Chief in what was then the Tennessee Water Science Center. He retained that role following the formation of the Lower Mississippi-Gulf Water Science Center (LMG) in 2015, and in early 2016 was selected as the LMG Associate Director for Hydrologic Investigations. As LMG Associate, and later Deputy, Director, Bill oversaw the development of a dynamic and successful water-science program in the LMG and personally participated in the development of studies advancing our understanding of integrated groundwater modeling, ecological and economic hydrology, water quality and sediment transport in large rivers, and novel approaches to streamflow prediction. His insistence on scientific quality and editorial clarity contributed to a culture of writing in the LMG that has earned a reputation for well organized, well written, readable, and scientifically significant reports. Although Bill now leaves behind the pleasures of budgets, work-plans, and performance reviews, we hope he will continue to polish his legacy of professionalism, dedication, and scientific rigor as a new Scientist Emeritus with the USGS. Bill was never fond of lavished attention, so we elected to recognize his career and many accomplishments in a few small local gatherings around the LMG. Others in the USGS who would like to reminisce and express their appreciation can reach Bill at his new home in upstate Vermont through his personal email address: wmjwolfe@yahoo.com

MEMORIALS

Henry W. 'Bud' Anderson, Jr., passed on December 29, 2018 in Sun City West, AZ. He was born and raised in Minnesota. He retired in 1990 from the USGS. His daughter-in-law stated that no obituary/memorial announcement was planned, and that he had been cremated.



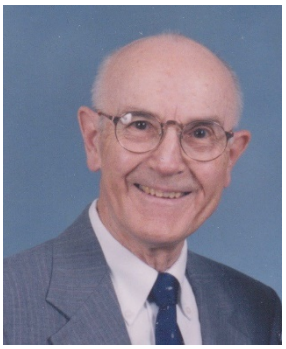
Charles William "Bill" Boning, 81, passed away on June 8, 2019, in Ashburn, VA, shortly after a heart attack. Bill was born on December 25, 1937, in Wenatchee, WA, to Charles Frederick Boning and Edith Lorene (Bolinger) Boning. Bill grew up in Leavenworth, WA and graduated from Leavenworth High School in 1955. After attending Wenatchee Valley College, he graduated from Washington State University in 1960, with a Bachelor's Degree in Agricultural Engineering. He married Shirley Morrow on June 18, 1960 and began his career with the U. S. Geological Survey in Spokane, WA, the next week. He earned a Master's Degree in Civil Engineering from Colorado State University in 1964. Bill enjoyed a successful 34-year career as a hydrologist with the Water Resources Division (WRD) of the U. S. Geological Survey. He had positions in data collection with substantial fieldwork in Washington, Alaska, and Virginia. He held management positions in Tennessee and California, and as the WRD District Chief in Texas from 1981-1989. He retired as Chief of the Office of Surface Water in Reston, VA, in 1994. Growing up on a farm as a youth, Bill was active in 4-H, and developed his life-long love of gardening, boating, fishing, and the outdoors. He enjoyed woodworking and time with his family, including serving as an adult Boy Scout leader for several years, where he transmitted his knowledge and calm enthusiasm to many Scouts. After retiring, he and Shirley enjoyed leisurely cross-country car trips in which they could spend time with family and friends and explore the country. They also enjoyed cruises in Europe. Bill served as secretary of the WRD Retirees for 15 years. He was actively involved in the National Association of Retired Federal Employees, serving in several offices. Bill was a life member of the Juneau Elks Lodge, a 60-year member of the Grange, and a member of Dranesville United Methodist Church. Bill is survived by his wife, Shirley of Ashburn, VA; two sons and their spouses, and a daughter and her spouse, seven grandchildren; and, three sisters. A Memorial Service was held in Ashburn, VA, on June 26, 2019, and later in Leavenworth, WA.

Michael 'Mike' Higgins, 75, passed away on April 4, 2015 in Clayton, GA. Mike was born in Rome, GA on January 27, 1940. When he was little, his father was in WWII and he and his mother lived with her parents in Rome. Mike used to tell the story about his grandfather taking him down to the railroad tracks to watch when president Roosevelt's casket passed by. He has many childhood and teen-aged escapades, one of which involved jumping on a train bound for Chattanooga with one of his friends while he was still in grade school. He went to Emory University where he was Pre-Med, but one summer he went on a geology field trip out west and fell in love with field mapping. He got a Masters in Geology at Emory and did his Doctorate and Post Doctorate work with Dr. Aaron Waters at UC-Santa Barbara, CA. Mike married and had two children, a son and a daughter. Mike began working in the Beltsville, MD office of the US Geological Survey in the mid-1960s and later moved to Reston, VA. In the mid-1970s he moved to Atlanta, GA to be closer to his field area within the Southern Piedmont and Blue Ridge. These areas, primarily in Georgia, Alabama and North Carolina would be the focus of his scientific interest and amazing field work for the remainder of his life. Mike authored or coauthored many valuable publications that contributed to the understanding of geologic processes worldwide including the 1971 classic USGS Professional Paper 687, Cataclastic Rocks. Mike was one of the last true field geologists and he was convinced that the answers were found only by looking at the rocks, not in the office formulating eloquent explanations that may or may not work when tested against actual field mapping. Mike met Evelyn Hopkins while working at the USGS and they married April 13, 2002. They built a lovely log house in the North GA mountains and moved there that summer. They enjoyed many hikes, especially on the blue ridge parkway and around Black Rock Lake. After retiring in 1998 from the USGS, Mike refused to give up the field work he loved so much. The last years of his life were spent in a self-funded effort to complete as much of his mapping of the Georgia Blue Ridge (and portions of the Piedmont) as possible. He left an incredible body of work and his legacy will always be an inspiration to those who loved him. Mike's is survived by his wife Evelyn, and his two children.

Timothy J. McElhone, 63, passed away at home on May 26, 2019 after a long illness. Tim was born on August 19, 1955 in Dearborn, MI to Charles and Virginia (Crane) McElhone. He was the "wisest" and oldest son of his ten siblings. Throughout his childhood he lived in Riverview, MI; Vermillion, OH; and Detroit, MI. He graduated from Benedictine High School in 1973 in Detroit, MI. On August 23, 1980, he married Christine Greider in Mendon, MI. In 1980, Tim and Christine moved to Madison, WI where Tim began working for the U.S. Geological Survey (USGS) as an IT specialist. They welcomed three children two daughters and a son in the early to mid-1980's. He continued his career within the USGS by transferring to Anchorage, AK; Tucson, AZ; Brownsburg, IN; and finally settling in Lansing, MI. In 2014, Tim retired from the USGS one month shy of 35 years as the IT Site Administrator. Tim worked in the Arizona District Office, Tucson, AZ in the Computer Service Section in the 1980's moving the District into the computer 'age.' Tim took over the supervision of the Computer Unit in the Indiana District Office, in 1993. He also served as a technical advisor on USGS Committees, such as ITAC. His children were the apple of his eyes. The family home was established in 1996 in Mason, MI and he appreciated the small-town life. Tim enjoyed community service including ReBuilding Together, Habitat for Humanity, and the Mason Holiday Light Parade Committee. His hobbies included gardening, NASA and outerspace, re-reading the Lord of the Rings Trilogy, Googling road signs, getting ice cream at the Daily Scoop, and taking "short-cuts" on road trips. Some of his favorite traveling adventures included visiting all 50 states, Ireland and Jamaica. He is survived by his wife of 38 years, Christine, and his two daughters, four grandchildren: He is preceded in death by his son, Adam Timothy, and his parents. The visitation was held at Gorsline Runciman Funeral Homes, E. Lansing, MI. The memorial service was held at the Unitarian Universalist Church, Lansing, MI on June 1, 2019.

Evelee Morris, 76, ***(wife of Ed Morris, retired Arkansas District)*****,** passed away March 9, 2019. Evelee was born December 18, 1942 to D.L and Elvie Clowers. Although her recent years were robbed by Alzheimer disease, Evelee lived a life of the kindness as wife, mother, sister, daughter, grandmother, teacher, friend, and church member. After receiving her Master's Degree in Education from the University of Central Arkansas, Evelee taught in the Pulaski County School District for 28 years and faithfully served Little Rock Church for over 33 years. Evelee had a servant's heart and always put others first. Evelee loved music, attending community bible study, and spending time with family. Her life is celebrated with memories of her sweet, mild spirit, her cooking, her love for travel, her love for her family and church. Evelee is preceded in death by her parents, D.L. and Elvie Clowers. She is survived by her husband of 55 years, Ed Morris; her sister and husband Nina and David Williams; two sons and their wives, Lane and Amy Morris, and John and Vicky Morris; four grandchildren, Connor, Shane, Emma, and Weston Morris; as well as several extended family members. A memorial service was held on March 12th at Little Rock Church, Little Rock, AR.

Laree Anne Perkins, 83, ***(wife of retiree Terry J. Perkins)*** passed away on March 26, 2019 in Independence, MO. Laree was the only child born to Alfred and Mary (Kindle) Sides on April 8, 1935 in Grand Saline, TX. She grew up and attended school in Van, TX. Laree later graduated from the University of Texas in Austin with her Bachelor of Arts degree in teaching and she began working as an English teacher. In the summer of 1963, while visiting friends in Cheyenne, WY she met Terry J. Perkins and within the year, they were married. The pair soon welcomed two children; a son and a daughter. Laree continued working part-time, but mainly stayed home to raise the children. She was a wonderful wife and mother. Laree was a member of Christ United Methodist Church for over 30 years where she loved singing in the choir and attending Sunday school. Laree loved spending time with her family, especially her three grandchildren, going to the symphony and theater with her husband and friends, reading the bible and other books, and shopping, especially for shoes. Laree never met a stranger, loved flowers and always enjoyed singing and dancing. Laree is survived by her loving husband, Terry; her son and daughter; three grandchildren; and many nieces and nephews. She was preceded in death by her father and stepmother, and mother and stepfather. Services were held on April 12, 2019 at Christ United Methodist Church, Independence, MO.



Bill Paul Robinson, 97, passed away on January 4, 2018. Billy (who was never a William) was born on a farm near Blodgett, Scott County, MO on December 12, 1921. His parents were Harvey Ernest Robinson and Carrie Bryant Robinson. Billy was the seventh of eight children. In late November of 1930, his family moved to Burlington, CO, arriving in a blizzard. During the summer of 1931, Billy was amazed to discover that summer evenings in Burlington were so pleasantly cool, compared with those in Missouri. Billy got his first look at the Rocky Mountains in the summer of 1937, during his softball team's trip to Denver to play in the state tournament. For the rest of his life, no matter where he lived or traveled, he always wanted to return to Colorado. Billy was the valedictorian of his high school class of 1939. He received a Bonfil's scholarship to the University of Colorado at Boulder, making him the first in his family to attend college. Billy majored in chemistry and graduated in 1943. One of Billy's first jobs, after graduation, was working for Dow Well. During his years there, he had several chemical patents and co-authored various chemistry-related articles for chemistry journals. In 1958, Billy married Doris Drake, in Denver, CO. In 1960, they had twin sons and their daughter was born in 1963. Billy began working for the Water Resources Division of the U.S. Geological Survey in Denver, CO. He wrote and edited reports regarding water quality. During his time with the Survey, he was transferred to offices in Washington, DC, Albany, NY and Indianapolis, IN. When Billy retired in 1985, he moved his family back to his favorite state, Colorado. Having been a child of humble beginnings, Billy felt blessed to have the means to ensure that his family lived a comfortable and secure life. One of his favorite charities was the Food Bank of the Rockies, because he never forgot having been chronically hungry as a child growing up during the Great Depression. Billy was proud to have been a 64-year member of the Burlington Masonic Lodge #77. He had many interests, including researching his family tree, collecting quotations, collecting photos and maps of Colorado, walking, going on road trips (he visited all the 48 contiguous states), participating in church activities, hanging out with family and friends, and reminiscing. Two of his favorite songs were: "My Dear," by Jan Garber and his Orchestra, and "Jesus Loves Me," which his mother used to sing. Billy also enjoyed Big Band and Patriotic music. Growing vegetables, fruit trees, and Blue Spruces was a passion of his, and he kept a beautifully healthy lawn at every home he owned, spending hours, daily, digging up weeds, while whistling his favorite tunes. Perhaps, living through the bleakness of the Dust Bowl inspired his love of plants, and of the color green. Billy always had spice cake for his birthday, and savored an occasional German Chocolate Blizzard, or a scoop of Friendly's watermelon sherbet. Billy was preceded in death by most of his beloved family: parents, seven siblings, son, Steven, and his wife, Doris. He is survived and sorely missed by his family.

Jack C. Rosenau, 99, passed away April 20, 2019 in Tallahassee, FL. He was born on October 26, 1919 in Detroit, MI. He was the oldest son of Arthur H. Rosenau and Florence M. McNally. Jack graduated in 1939 from Cass Technical High School's Aeronautical Curriculum and joined the U.S. Marine Corps Reserve in 1937 while still a high school student. His fighter squadron was called to active duty in 1940. He served as weather forecaster for the First Marine Air Wing in the South Pacific during World War II, stopping at Noumea, New Caledonia, and Espirito Santo as part of the Guadalcanal Campaign. Upon his return to the States in 1943, Master Technical Sergeant, Jack's assigned responsibilities included operation of the weather office at El Toro Marine Corps Air Station in Santa Ana, CA. It was here he met and married his wife, Marine Sergeant Jean L. Aitkenhead (now deceased), and was honorably discharged in 1945. While in the Marine Corps, Jack flew in several military aircraft, including the S.B.D. Dauntless Dive Bomber. He earned his private pilot certificate in 1964, flying out of Wheeler Field, Oahu, Hawaii. His Instrument Rating was earned in 1978. Jack earned a geology degree at Michigan State College in 1949 and was commissioned in the Army Field Artillery. His commission was transferred to the Air Force Reserve in 1950, where he then served as a weather forecaster, and promoted to Lieutenant Colonel in 1970, and retired in 1979 after 30 years of military service. Jack was employed with the Michigan Geological Survey until hired by Dr. D.B. Steinman, Consulting Engineer, for construction of the Mackinac Straits Bridge, joining Upper and Lower Michigan. On completion of the bridge work, Jack was hired by the U.S. Geological Survey's Ground Water Branch serving in New Jersey, Hawaii, and Florida, where he coauthored Springs of Florida. He retired from the USGS in 1985. Jack was a member of several scientific organizations, including the Geological Society of America. The U.S. Coast Guard

Auxiliary has been a special organization for Jack. He joined Flotilla 13 at Shell Point, FL, in 1974, and flew his Cherokee (N-192FC) for search and rescue patrols. Over a span of twenty-five years, Jack flew 550 patrols and Tallahassee inducted him into their "Aviation Wall of Fame" in 2006. Jack was a member of the Military Officer Association of America, the Experimental Aviation Association, Veterans of Foreign Wars, and was an active member of both the Quiet Birdmen and the Marine Corps League. Jack was also a member of the Tallahassee Saint Andrew Society since 1979. Jack's children include: five sons and two daughters. Jack has 16 grandchildren, and nine great grandchildren. Visitation was held on April 25, 2019, at Abbey Funeral Home, Tallahassee, FL, and followed by funeral services. Interment, with military honors, will follow at Tallahassee Memory Gardens.

NEWS NOTES ON SUSTAINABLE WATER RESOURCES
Submitted by Tim Smith

Sea Level Changes

Changes in sea level could lead to major impacts on the land. For example, here is a case in which the erosion rate of coastal cliffs would greatly increase:

https://www.usgs.gov/news/sea-level-rise-could-double-erosion-rates-southern-california-coastal-cliffs
U.S. Geological Survey scientists combined several computer models for the first time to forecast cliff erosion along the Southern California coast. Their peer-reviewed study was published in a recent issue of the American Geophysical Union's ***Journal of Geophysical Research - Earth Surface.***
The research also showed that for sea-level rise scenarios ranging from about 1.5 feet to 6.6 feet by 2100, bluff tops along nearly 300 miles of Southern California coasts could lose an average of 62 to 135 feet by 2100 – and much more in some areas.
A closer look at the problem reveals that sea level changes can be connected to climate change.

Global sea level and the Earth's climate are closely linked. The Earth's climate has warmed about 1°C (1.8°F) during the last 100 years. As the climate has warmed following the end of a recent cold period known as the "Little Ice Age" in the 19th century, sea level has been rising about 1 to 2 millimeters per year due to the reduction in volume of ice caps, ice fields, and mountain glaciers in addition to the thermal expansion of ocean water.
Climate-related sea-level changes of the last century are very minor compared with the large changes in sea level that occur as climate oscillates between the cold and warm intervals that are part of the Earth's natural cycle of long-term climate change.

During cold-climate intervals, known as glacial epochs or ice ages, sea level falls because of a shift in the global hydrologic cycle: water is evaporated from the oceans and stored on the continents as large ice sheets and expanded ice caps, ice fields, and mountain glaciers. Global sea level was about 125 meters below today's sea level at the last glacial maximum about 20,000 years ago (Fairbanks, 1989). As the climate warmed, sea level rose because the melting North American, Eurasian, South American, Greenland, and Antarctic ice sheets returned their stored water to the world's oceans. During the warmest intervals, called interglacial epochs, sea level is at its highest. Today we are living in the most recent interglacial, an interval that started about 10,000 years ago and is called the Holocene Epoch by geologists.
A more complete discussion of this phenomenon can be found here:
https://www.usgs.gov/special-topic/water-science-school/science/sea-level-and-climate?qt-science_center_objects=0#qt-science_center_objects

No matter what the cause may be, changes in sea level could cause impacts on current land uses that are far greater than any in the past. Action to address potential problems therefore becomes an important consideration.

The Sea-Level Rise Hazards and Decision-Support project assesses present and future coastal vulnerability to provide actionable information for management of our Nation's coasts. Through multidisciplinary research and collaborative partnerships with decision-makers, physical, biological, and social factors that describe landscape and habitat changes are incorporated in a probabilistic modeling framework to explore the future likelihood of a variety of impacts and outcomes. Scenario-based products and tools can be applied to inform adaptation strategies, evaluate tradeoffs, and examine mitigation options

Advanced decision-support methods are required to provide technical expertise to those decision makers who must take action in such cases. More information about this aspect of the problem can be found here:

https://www.usgs.gov/centers/whcmsc/science/sea-level-rise-hazards-and-decision-support-0?qt-science_center_objects=0#qt-science_center_objects

In general, problems might be expected to occur in land loss from inundation and erosion, migration of coastal landforms, changes to groundwater systems, and changes to coastal habitat

NEW MEMBERS

Coffin, Robert (13) – 2941 Inverloch Circle, Duluth, GA 30096, (h) 770-476-5482, rccoffin24@gmail.com
Ethridge, Max (18) – 1263 S. Otis St., Lakewood, CO 80232, (c) 573-465-2936, mmex0807@gmail.com
Grillo, Debra A. 'Debbie or Deb' (19) (Tony) – 28711 Mountain Hwy E., Graham, WA 98338, (h) 253-847-2795, deb04202001@yahoo.com
Sallas, Jeffrey S. 'Jeff' (19) – 505 Mark Rd., Knoxville, TN 37920, (c) 865-712-4218, jsal02@gmail.com

AFFILIATES LIAISONS

Anthony, Stephen S. 'Steve' (AL) (Leona) – 1039 Wainiha St., Honolulu, HI 96825 (c) 808-428-6925, 808skier@gmail.com ***(Hawaii Water Science Center)***
Conlon, Terrence D. (AL) (Gwen Porus) – 3000 NE 29th Ave., Portland, OR 97212, (c) 971-645-2887, (w) 503-251-3232, tdc60@yahoo.com ***(Oregon Water Science Center)***
Fallon, James D. (AL) (Christina) – USGS, 2280 Woodale Drive, Mounds View, MN 55112, jfallong@usgs.gov ***(Minnesota Water Science Center)***
Jones, Joseph L. (AL) – Washington Water Science Center, 934 Broadway, Tacoma, WA 98402, (w) 253-552-1684, (c) 253-224-9078, jljones@usgs.gov or josephljones@comcast.net ***(Washington Water Science Center)***
Weaver, Thomas L. (AL) (Dawn Autio) – 6029 Oakpark Trail, Haslett, MI 48840, (w) 517-285-5908, (h) 517-339-0339, cprtom@comcast.net or tlweaver@ugs.gov ***(Minnesota Water Science Center)***
Weir, Lori R. (AL) (Chris) – 809 Aimes Court, Nashville, TN 37221, (w) 615-837-4720, (c) 615-347-9496, lrweir@usgs.gov or lori.r.weir@gmail.com

DIRECTORY CHANGES

Anning, David W. (18) (Adrianne) – 1073 S. Ridge Road, Cedar City, UT 84720 -- addr
Curtin, Steve (16) (Mary Dee) – 443-370-3386 phone
Eimers, Jo Leslie 'Jody' (17) – (c) 703-953-0107 – corrects cellphone no.
Felsheim, Dolores (S) – St. Theresa, 8008 Bass Lake Rd., New Hope, MN 55428, 763-531-7797 – addr phone
Fischer, Edward E (13) – 735 George St. Apt 481, Iowa City, IA 52246-5012, edfini5@gmail.com – addr email
Hidalgo, Shirley M. (97) – 8360 Coors St. Arvada, CO 80005 -- addr
Kuzniar, Ronald I. 'Jay' (16) Katherine) – *correct 'Nickname' –* ***remove Jay*** *and* ***enter 'Ron'***
Kume, Jack (96) (Dianna) – 448 W. Cedar St, Olathe, KS 66061-4022, (c) 913-909-3572, jackkume@comcast.net – addr add cell and email
Miller, Kathleen A. 'Kathy' (99) (Joe) – 3395 Wentworth Pl., Iowa City, IA 52240 – corrects spelling of street name
Moore, Mrs. L. Grady (Judy) (S) – corrects email address moorebells@gmail.com
Oberg, John L. (90 (Joan) – 1059 US Hwy. 2/41 Apt. 208, Bark River, MI 49807, 906-202-0588, joberg807@gmail.com – addr phone email
Pederson, Gary (2) (Mary) – *received request on May 16, 2019* ***resigning*** *from retirees' organization.*
Rose, Theresa (09) – theresarose28@gmail.com -- email

State Contact

Western Region			
Nevada	Kerry T. Garcia (replaces Charlie Morgan)	775-882-4190	garcia4nv@att.net

What Happens if Drought Breaks the Law of the River?
By James Bennett

As used here, the 'Law of the River' refers to the Colorado River Compact of 1922 which is an agreement on the distribution of the flow of the River between the upper and lower basin states of the River's Drainage. The upper basin states are Colorado, New Mexico, Utah and Wyoming. The lower basin states are Arizona, California and Nevada. Lees Ferry Arizona is the location on the River where the delivery of flow to the lower basin is determined and the minimum apportionment is set at 7.5 million- acre feet (maf). In addition, the US is obligated to deliver 1.5 maf to Mexico which is first required to come from 'excess' and is not otherwise defined in the Compact. This amount has recently had to come half-and-half from each entity's allocation. Thus, the minimum delivery of Colorado River water at Lees Ferry is required to be 8.25 maf, an amount equal to an average annual flow rate of 11,400 cubic feet per second (cfs). In the Compact, the only provision for an insufficient supply from the upper basin is a requirement that the rolling 10-year amount of delivery be at least 75 maf.

Fifteen river miles above Lees Ferry is Glen Canyon Dam and since it's closure in 1963, the upper basin has been able to store water in the reservoir it creates, Lake Powell. The dam is a 710 ft arch-gravity dam that is operated as a hydroelectric facility by the U.S. Bureau of Reclamation (USBR). Downstream of Grand Canyon in Nevada lies Hoover Dam that impounds Lake Mead where the lower basin stores water. This dam is also an arch-gravity structure 726 ft high, operated as a hydroelectric facility by the USBR. In addition to the annual delivery of the Compact-delegated flows, the USBR rules for operating the facilities are somewhat complicated. Primarily among the rules is the need to keep the lake elevations high enough to continue generating electricity and to roughly balance the storage in the two reservoirs.

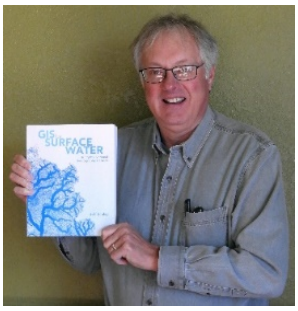
Lake Powell filled in 1980 at an elevation of 3,700 ft (above mean sea level) with a corresponding storage of 26 maf. The average annual lake elevation hovered above 3,680 ft with storage around 23 maf until 1985 but the trend in both since then has been gradually downward. During the 2018 water year (October 1, 2017 to September 30, 2018), the averages were 3,604 ft and 12.2 maf. The cut off for power generation is 3,490 ft. As determined from the nearest upstream gages on the Colorado, Green, and San Juan Rivers plus four smaller streams, the latest 10-year average inflow into Lake Powell was 9.16 maf while the outflow was 8.99 maf. During that time, the average reservoir elevation dropped 8 ft. The Colorado River Basin has been in drought for 20 years and climate science indicates that this could be the new normal. It may well be that even with the storage in Lake Powell, the upper basin can no longer generate the flow level specified by the Compact. For several years, the U.S. Department of the Interior has urged the basin states to agree to a drought contingency plan (DCP) to deal with this situation. In March of 2019, a draft two-part plan was submitted to Congress. The language of the plan runs to quite a number of pages, but as quoted from a USBR website, the essential elements are:

- The Upper Basin DCP is designed to: a) protect critical elevations at Lake Powell and help assure continued compliance with the 1922 Colorado River Compact, and b) authorize storage of conserved water in the Upper Basin that could help establish the foundation for a Demand Management Program that may be developed in the future.

- The Lower Basin DCP is designed to: a) require Arizona, California and Nevada to contribute additional water to Lake Mead storage at predetermined elevations, and b) create additional flexibility to incentivize additional voluntary conservation of water to be stored in Lake Mead.

The detailed DCPs contain specific conditions to trigger reductions in allocations if required by continued drought (or climate change?) and provide a reasonable and fair way to conserve the water rights of the 40 million people and agricultural and commercial interests in the basin.

GEOGRAPHY MATTERS
Randy Olsen (Retired USGS 2006)



This is the second article in this series – the last one covered why I wanted to do this series of articles and how USGS is currently organized. This article will focus on topographic maps – legacy and what is available now. I believe the new term for mapping is geospatial data. If you want a hardcopy map, then you can print it out as an application of geospatial data. There remain maps available that focus on camping and recreation at stores - many of which are our traditional map dealer partners. The maps typically are over high-visitor use areas. Some that are based on our maps have up-to-date trails and camping info; an example is the National Geographic Society *Trails Illustrated* series. Otherwise you are on your own with downloading maps from the USGS website or ordering from the USGS Store.

Having said that, our proud heritage of finishing once-over coverage of mapping of the country in the early 1990's is preserved in an historical archive and available as digital files or hard-copy maps. This includes the original State series, 1:250,000-scale quadrangles (quads), 1:100,000-scale quads, Trust Territories and Commonwealths, the 15-minute maps in Alaska, and the most recent 1:24,000-scale quads in the lower 48, including Hawaii and some in Alaska. The most recent quads predominantly are standard USGS topo maps that include limited revision editions in purple tint, the metric series, provisional editions, and a few with orthophoto overlays where there weren't many contours.

Some background here for USGS folks that were not directly involved in the mapping program. In the late 1970's, under the Carter administration, there was a move to go metric. So, for a couple of years, new quad maps were 1:25,000-scale. About the same time, map design was changed to be more adaptable to digitizing, so double cased roads became uncased grey color with the width based on major arterials version residential streets. Urban tint changed from off red to grey, and geographic names were changed to a non-serif font. There were other changes not discussed herein. The provisional series was an attempt produce maps for the remaining 10,000 or so unmapped areas. These maps have hand-drawn labels and are not quite up to the traditional quality of line work. Having said that, the once-over coverage of the country happened quickly and finished in the early 1990's. These maps are now considered "historical."

The geospatial program at USGS is now providing topographic maps at a three-year cycle using the best available data. The program is called *USTopo* and is available for printing or downloading as a digital file. For us "experienced" mappers, there is good and bad news. Starting with the bad news, these maps do not have spot elevations and there is no attempt to deal with people that have GPS elevations on mountain tops that differ from the old topo maps. These maps may or may not have complete boundaries, public land surveys, or cultural sites, depending on which agency has provided current info. The good news is that they have the best available data from other sources, such as Census on roads, contours from LIDAR contracts, and they are on the new North American Datum 83 (NAD83). Lidar is a relatively new technology that uses lasers to accurately measure the elevations from aircraft. It has some interesting aspects beyond accuracy. The elevations capture tree canopy but are dense enough to "see" through trees in clearings. With a little editing, the bare earth can be captured and re-gridded into an elevation model, and where there is canopy, the tree height can be used for forestry research and applications.

I think that the USGS is doing the best it can with the resources available. The younger generations are OK with downloading digital data and the USGS has new people that are responsive to the geospatial contributions that USGS can provide. The old joke in the late 90's after downsizing and budget cuts was who was going to turn off the lights. The good news is that the lights remain on and we have a new group of mapping (geospatial) professionals to keep things going. I feel better about our legacy than I did 10 years ago.

I have been reading the book *"The Promise of the Grand Canyon"* by John Ross. This is a good read for those of you that are into historic surveys and the time of John Wesley Powell as a Grand Canyon explorer and then

Director of USGS. It's not just about Powell and the Grand Canyon. It also includes interesting tidbits about the other original surveys by Hayden, King, and Wheeler.

This reminded me about the major rainfall event in 1983 in the Upper Colorado Basin that almost caused the dam to fail at Lake Powell and Glen Canyon. Lake Powell has not been at that level since then and is at record lows currently.

How to get maps:
By phone: USGSmap store – 1-888-ASKUSGS Option 1
Email: usgsstore@usgs.gov
Web: https://store.usgs.gov
Also https://www.usgs.gov/core-science-systems/national-geospatial-programs/maps
Datum Issues Website: https://www.usgs.gov/faqs/why-are-historic-maps-referenced-outdated-datums

USING THE USGS LIBRARY
By Tim Smith

The USGS Library can be found at: https://www.usgs.gov/core-science-systems/usgs-library
Email: library@usgs.gov

Here are the contacts for the USGS Library:
Reston, Virginia
703-648-4301 9am to 4pm Eastern, M-F

Denver, Colorado
303-236-1015 8am to 4pm Mountain, M-F

Menlo Park, California
650-329-5027 8:30am to 4:30pm Pacific, M-F

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