USGS RETIREES

NEWSLETTER No. 192
November 2021

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.

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USGS Retirees
P.O. Box 280
Herndon, VA 20172-0280
Phone (703) 596-5468
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PRESIDENT'S MESSAGE

Hello Fellow Members:

I am totally honored to have had the opportunity to serve as your President for our great and unique Retirees' Organization. This is my final message in 2021 but will have some closing thoughts about these last two years and future considerations in next February's Newsletter.

On pages 6 and 7 the biographies of six National Officers and four Regional Representatives. Except for the President, me, and the Central Region Representative, Ken Lindskov, all of the current Officers and Regional Representatives have volunteered for another term. Bill Carswell and Bob Swanson are listed on the Ballot (page 8) to replace me and Ken, respectively. Included with the ballot are changes to Bylaw III, Sections 1, 2, and 4 for your approval. In the past few years, we have had difficulty in getting volunteers to seek these elected positions. Therefore, Section 2 changes our biennial elections on the odd years to the president only. That position will remain eligible to serve a second term. All other positions are considered permanent and will only come up for election if a vacancy occurs. The Secretary position (Section 4) is critical with numerous, time-consuming responsibilities. To provide some relief, the task of taking minutes for Board meetings is to be delegated to any of the Board members. Section 1 changes the term of a Regional Editors to continuous until the incumbent vacates the position.

The Part II article on changes in the USGS Water Program (pp/ 9-14), based on interviews with Data Chiefs and Technicians, reveals significant changes and innovations in the collection and processing of hydrologic data. We commend the authors, Herb Freiberger, Cathy Hill, and Dennis Sulam for outstanding reporting. This is a must read!

The scholarship process for 2021 is completed with the awarding scholarships to the following six recipients: Gary Burke, OK-TX WSC; Shelby Daniel, S. Atlantic WSC; Noel Deyette NY WSC; Heather Manzi, CA WSC; Madelyn Messner, OH-IN-KY WSC; and Shannon Pace, VA-WV WSC. Find photographs of the recipients and their write ups on Pages 15 to18. Congratulations to these deserving applicants that included a couple of long-term employees.

When you receive this Newsletter, you have a little less than 3 months to register for the March 10-12, 2022 Reunion in Tucson. If you are planning to attend, we strongly urge you to make your hotel (no cost and free cancellation) reservations NOW. By knowing the number of reservations, the planning committee can make their projections on necessary procurements and changes. It will be over 3 ½ years since the last reunion. I for one am anxious to again see USGS colleagues and friends and to meet and befriend new acquaintances. The events planned certainly will be enjoyable, the location and venue are terrific, and the weather for early March should be fantastic. Tucson is perfect for a large turnout. Our biennial reunions are one of the benefits of membership and large attendances are an essential element in maintaining the viability of our organization.

See below an important and much needed request for volunteers with IT knowledge. We need to upgrade management and electronic filing of documents in an accessible and secure manner. I want to thank our Secretary, Kate Flynn for preparing this request and the draft of features to be considered.

As always, I encourage you to submit articles for the "News of Retirees." We all enjoy hearing the latest happenings in your retirement.

Thank you for the opportunity to serve as your President,

Pete

The Retirees' Officers have decided it is time to upgrade our technology. We are seeking volunteers to form a committee to assist in identifying and reviewing solutions for managing our IT needs. In the past, the retirees had a USGS user account and computer, but USGS and Interior security requirements make this option impractical. An ideal solution would be a cost-effective, easy-to-use, all-in-one membership management system. See wrdretirees.com/ITSolutions.pdf for a rough draft of features to be considered. If you would be interested in working on this or just want to offer thoughts, please contact us at wrdretirees2014@gmail.com. -Thanks, Kate Flynn

USGS Retirees Reunion

Reserve the dates
March 10–12, 2022 in

TUCSON, ARIZONA

Take a break from the cold, clouds, and snow of next winter to join your friends and former colleagues in the sun, warmth (avg. high of 78º F), culture, and beauty of Tucson and Southern Arizona! For the March 2022 Reunion, we have a signed agreement with the Marriott Tucson University Park Hotel for a daily room rate of about $155 (including tax and fees). The Marriott Hotel is adjacent to the University of Arizona and close to shopping, dining, and entertainment at Main Gate Square. The hotel also is a quick light-rail ride to down-town Tucson; an easy drive to Saguaro National Park East and West; and close to USGS offices on campus, hiking trails, golf courses, museums, and birding sites. If you're interested in extending your stay, the hotel agreement includes holding the reunion room rate for three nights prior to and after the reunion dates. We hope to see you in person in Tucson!

https://www.marriott.com/hotels/travel/tusmp-tucson-marriott-university-park/

Conde Nast Traveler (May 2021) just named Tucson as one of its Where to Travel Next: Hot list 2021 destinations. "Most come to Tucson for its miles of hiking trails under year-round sunny skies, but it's also worth planning a triparound its food industry. The city is the first place in the U.S. recognized by UNESCO for its gastronomy, and it's easier than ever to seek out its Mexican and Native American heritage."

Stephanie Wu (2021, Conde Nast)

<u>NOTE:</u> For those concerned about the ongoing COVID19 pandemic and what measures both the hotel and City of Tucson have implemented - you can either click on the url below or type in the reunion webpage which contains the web addresses for both the hotel and the City of Tucson
http://www.wrdretirees.org/Reunions/2022Tucson/index.html

SIGN-UP FOR LONG-OVERDUE REUNION
University Marriott
880 E. Second Street
(520) 792-4100 (Mention USGS Reunion)
Room rate is $155/night including taxes and fees.
Hotel Reservations open September 1, 2021

NOTE:
-The Registration Form does not include the Hotel Room Reservation.
-Hotel offers Reunion block rate 3 days before and after Reunion if you desire to extend your stay.
-No cost for reservation and canceling.

Highlights of Tucson Area Tour
Friday March 11th (11:30 a.m. – 5:00 p.m.)

The easiest way to see and experience the uniqueness of the Tucson area is a bus tour with multiple stops at some unique places. Buses will pick us up at the Hotel for a departure at 11:30 a.m. on Friday with an option to buy a box lunch. Some sites are under negotiation, others still closed due Covid, but a great tour is promised. Some examples are:

San Xavier Mission established in 1692 and completed in 1797. It is the oldest intact European structure in Arizona. https://www.sanxaviermission.org/

The **309th Aerospace and Maintenance and Regeneration Group** often called the Boneyard, is a United States Air Force aircraft and missile storage and maintenance facility located on Davis–Monthan Air Force Base. Established after World War II, the AMARG manages 4,000 aircraft-- the largest-aircraft storage facility in the world. Many unique aircraft are found here.

https://en.wikipedia.org/wiki/309th_Aerospace_Maintenance_and_Regeneration_Group

The Gem and Mineral show in Tucson will be over by the time of our reunion but the University of Arizona has opened a new Gem and Mineral Museum in the old Pima County Courthouse with impressive specimens and a link to the mining history of the area.
http://gemandmineralmuseum.arizona.edu

Other possible sites, include Old Town Artisans, Saguaro NP and a demonstration of drone technology by the AZWSC, are planned with more details to follow.

Description of Sonoran Desert Museum Tour
Saturday March 12th (8:30 a.m. – 1:00 p.m.)

The Arizona-Sonora Desert Museum is a 'must see" place when visiting Tucson and the Sonoran Desert. We have chartered 2 buses that will pick us up at the Hotel on Saturday morning and deliver us to the facility which is about 23 miles west of the University campus. Primarily outdoors and comprised of a zoo with mostly native desert species, an extensive botanical garden, two art galleries, and a natural history museum. The Desert Museum sits on 98-acres of pristine desert landscape. The Museum showcases the diverse flora and fauna of the Sonoran Desert region with over 55,000 plants. Wildlife can be viewed such as coyotes, javelinas, mountain lions, and bighorn sheep in naturalistic habitats. Bird lovers delight in visiting the Museum's two aviaries, one dedicated to hummingbirds. The Museum's gift shops offer an incredible bounty of books, jewelry, crafts, and more. Handicap accommodations are available. https://www.desertmuseum.org/

OTHER ACTIVITIES

Golf

We want to create the opportunity for the golfers among us to take advantage of our beautiful courses Thursday afternoon or Sunday morning or both days. Rather than guessing the best event timing and format, we have time to base it on the input of those interested in participating. Tucson has a wide range of municipal and public courses available from ~$40 per round to high-end resort courses with prices in the low triple digits. An expression of interest will result in your receiving a survey to give us your preferences in day or days, cost range, format (scramble, best ball, mixed gender foursomes just playing golf, etc.,). Contact Bob MacNish at macnish7@gmail.com **by January 1, 2022** to express an interest and help us put together a golf experience that all will enjoy.

USGS Jam session

In addition to having world-class scientists, USGS has its share of talented musicians, who have gathered often for informal jam sessions. We would like to have an evening of music at our reunion, perhaps on Friday, March 11. Bring your favorite acoustic instrument, and maybe sheets with lyrics and chords to share. If you can't bring an instrument, we may have a few to share. Stan Leake has offered to loan some of his instruments (guitar, upright bass, banjo mandolin, banjo, uke, 5-string banjo, fiddles, and button accordions), and we are sure that there will be an extra guitar or percussion instruments. If interested, contact Pat Tucci at ptucci@sprintmail.com **by February 15, 2022** so that we can arrange space. Hope to hear you there!

REGISTRATION FORM -- 20TH USGS RETIREES REUNION 2022
Tucson, Arizona
Thursday, March 10 through Saturday, March 12, 2022

http://wrdretirees.org/Reunions/2022Tucson/Invite%20flyer%20vf.pdf

Complete this form, make check payable to "**USGS Retirees Reunion**", and mail to:

USGS Retirees Reunion c/o Stan Leake or Mark Anderson
1645 W. Valencia Rd Suite 109, PMB266
Tucson, AZ 85746

Note: This Registration Form **does not** include the Hotel Room Reservation. Encourage you to call early the University Marriott directly at: (520) 792-4100, **mention USGS Reunion**. Hotel offers Reunion block rate 3 days before and after Reunion if you desire to extend stay. No cost for reservation and canceling.

Room rate is $155/night including taxes and fees; **Hotel reservations open September 1, 2021**.

REUNION REGISTRATION--Deadline February 1, 2022 - Refunds are available prior to the February deadline.

Print first and last name(s) as you'd like on name tag(s):

RETIREE (1st, last):_____ SPOUSE (1st, last):_____
Year Retired _____
STREET ADDRESS_____
CITY_____ STATE_____ ZIP CODE_____
EMAIL_____ **PHONE**_____

REGISTRATION FEE:	**NUMBER____ @ $95 per person**	$

Includes Thursday evening ice-breaker reception, with drink ticket and hospitality room for the three days.

Thursday, March 10, 2022

Reunion check-in is 2:00 to 7:00 p.m. Hospitality Room open at 3:00 p.m. Informal Reunion ice-breaker reception (6 pm to 9 pm). The Hospitality Room will be closed during the reception and subsequently reopened.

TOURS: (One Friday and one Saturday) capacities are limited and filled based on date of registration. Refunds will be given for applications received after maximum capacities have been reached:

Tucson Area Tour, Highlights, Friday (11:30 am - 5:00 pm) March 11, 2022:

(Maximum Capacity 100)
Optional Box lunch $15

Number for tour: _____ @ $65 /person =	$
Number for lunch: _____ @ $15 /person =	$

Arizona-Sonora Desert Museum, Saturday (8:30 am to 1:00 pm) March 12, 2022: https://desertmuseum.org

Tour includes transportation, museum entrance fee, and refreshment. (Maximum Capacity 100).

Number: _____ @ $50 per person	$

Banquet, Saturday (6:00 p.m. to 9:00 p.m.) March 12, 2022:

Banquet in Ballroom in hotel. The Hospitality Room will be closed during the banquet and subsequently reopened.
Choose from entree's below:

Indicate Entrée Choice(s) by first name:	**Mex Chicken**	**Steak**	**Vegetarian**	**Indicate meal choice**	
	$56	$56	$56	Number:____@ $56 per person	$
				Includes all taxes, tip, 1 drink ticket	

TOTAL (Registration, Tours, and Banquet):	$

Reunion Web Site for additional information: http://wrdretirees.org/Reunions/2022Tucson/

Questions? markandersonwater@gmail.com AZStan@gmail.com ptucci@sprintmail.com

ELECTION OF USGS RETIREES' OFFICERS: 2022 - 2023 BIENNIUM
And, BYLAWS III, SECTIONS 1, 2 and 4 AMENDMENT
SEE PAGE 8 FOR BALLOT

It is election time. The slate of candidates, selected by the Board of Directors, is shown below with a brief biographical sketch for each.

President, William 'Bill' Carswell: Bill started with the USGS Surface Water Branch in 1965 in Topeka, Kansas, as a Physical Science Aid. He served in the U.S. Army in 1968-1969. After being discharged, he returned to the USGS and began attending college while working full time. He continued working in the Data Section and in 1974 was appointed as the Lawrence, Kansas, Field Office Chief. He was reassigned to the Studies Section in 1975 and converted to Hydrologist in 1976. In addition to his project work, he has been a Studies Section Chief in South Carolina; Nevada State Office Chief; Nevada District Chief; Arizona-Nevada-Utah Area Hydrologist; Northeastern Region Program Officer; Delaware River Master; Regional Hydrologist Northeastern Region; and Regional Executive for Water in Central Region. In 2006, he was reassigned to Reston as the first Director of the National Geospatial Program Office and retired in mid-2008. He has authored over 60 scientific reports. Bill has a Bachelor's Degree in Business, Master's in Water Resources Science, and Ph.D. in Engineering. He lives in Lawrence, Kansas, with his wife Linda and has a son and two stepdaughters.

Vice President, D. Phil Turnipseed: Phil began his USGS career with the Mississippi District in 1987 working on hydraulic bridge design and subsequently became project chief, Surface Water Records Unit for 10-years. He served as the Texas Surface Water Specialist then principal USGS liaison to the U.S. Army Corps of Engineers in Reston, Virginia (2004-2010). He was Director of the U. S. Geological Survey's National Wetlands Research Center (2010-2014) guiding global expertise in forest and wetland ecology and geospatial design and application. In 2015, Phil served as Senior Science Advisor for Water Programs for the USGS Southeast Region. Phil has published over 80 peer-reviewed reports, journal articles, conference proceedings, and posters and speaks fluent Spanish and some limited French. He was a registered professional engineer in Mississippi and Louisiana and an at-large member of the American Academy of Water Resources Engineers Board of Trustees and has maintained as scientist emeritus since retiring in 2015.

Secretary, Kate Flynn: Kate began her career with USGS in 1974 as a hydro tech at the Gulf Coast Hydroscience Center in Bay St Louis, MS; working on the Flood Plain Simulation and Deterministic Modeling projects. In 1984, she transferred to the Office of Surface Water in Reston. In Reston she worked with watershed modeling software and flood and low flow frequency software, providing user support and training on the software to Water Science Center staff. Kate retired in 2016.

Treasurer, Cathy Hill: Cathy began her career with USGS in 1976 as a physical science aid in the Atlanta lab. From there she moved to the Georgia District as a Hydrologist, then Office Chief of the Statesville Sub-district Office. This was followed by Project Leader and Data Section Chief in the Raleigh Office. From there she went to the Director's Office as Staff Assistant, then the Northeast Region as Area Hydrologist, followed by WRD Operations Chief, and finally Northeast Regional Hydrologist. She retired from the USGS in 2006.

Archivist, Herb Freiberger: Herb worked two coop periods with the USGS WRD and graduated from Drexel Institute of Technology, Civil Engineering. In 1967, he began his career as an entry level Hydraulic Engineer with USGS, Trenton, NJ working mostly in the data section and later as co-project leader on a flood study. In 1970, He transferred to Miami. FL as a project member on water-quality studies in the Big Cypress Swamp and Everglades. In 1973, he transferred to Louisville, KY to become the Chief, data section for Central and eastern, KY. He then transferred to Reston, VA in 1977 to complete a management trainee program in the Northeast Region. This was followed by a transfer to Baltimore, MD in 1980 where in succession became the District Chief, MD-DE-DC, Area Hydrologist, Mid-Atlantic Area and later Program Officer, Northeastern Region. Herb retired from the USGS in 2002. He served as President, WRD Retirees Association in 2011-2012

Northeastern Region, Norman (Norm) Granneman: Norm retired in 2016 after a 39-year career with USGS. Over these years, he oversaw, in reverse order, the USGS Great Lakes Restoration Initiative programs, Groundwater Resources Program activities, the Michigan Basin RASA study, and groundwater projects in the Michigan Water Science Center. Norm and his wife Karen live in Okemos, Michigan. They have two grown children and one grandchild. They all spend as much time as possible on what remains of the Grannemann Century Farm in Missouri where Norm was born and raised.

Southeastern Region, Edward H. (Ed) Martin: Ed Martin began his career with the USGS in 1976 in the Jonesboro, Louisiana Field office. His forty-year career included duty locations in Louisiana, Colorado, Florida, and Georgia. As a manager he was the District Chief of the WRD Louisiana District 1993-1998 and District Chief/Director of the Georgia Water Science Center, 1998 to 2016. He retired in 2016 and now lives with his wife in Lawrenceville, GA.

Central Region, Bob Swanson: Bob joined the USGS in 1974 as a hydrologic technician and later, as a hydrologist in the Nebraska District Data Section. He worked in the Lincoln, Cambridge, and Ord sub-district offices, as well as, opening a field office in North Platte, NE. He was staff hydrologist and Chief for a NAWQA study-unit in Nebraska. Bob transferred to Cheyenne, WY as Data Section Chief in 1999. He returned to Lincoln in 2004 to serve as the Nebraska Science Center Director in 2004 and retired from that position in 2018. He continues to volunteer for the NEWSC running the occasional station levels trip and measuring GW levels. Bob and his wife, Kate, reside in Lincoln, NE.

Western Region, Pat Tucci: Pat started with the USGS in Indianapolis as a hydrologic technician and then as a hydrologist. From there he began his wandering USGS career in the Tucson, Miami, Nashville, Puerto Rico offices. He then worked for the Yucca Mountain Project in Denver, and when funding for that was cut, he also worked part time for the International Hydrology office, the Office of Ground Water (Borehole Geophysics Advisory Group and ICOM), the Iowa District, and the Central Region. He finished his career as the Central Region Ground Water Specialist before retiring in 2007. He now lives in Sedona, Arizona, spending much of his time playing guitar at local open-mic nights, and working in their mineral and fossil business, GEOdyssey, LLC. He also serves as the Arizona State Representative of the Retirees Organization and has been assisting in planning the 2022 reunion in Tucson.

Newsletter Editor, Jeff Stoner: Jeff became a hydrologist in Billings, MT in 1974. He also did science in Pittsburgh, PA, and St. Paul, MN. He became a Studies Chief and NAWQA study-unit Chief in Minnesota. He became the NAWQA Nutrient National Synthesis Chief out of Denver. He returned to St. Paul to be District Chief. With all these chiefdoms, he decided to try Program Officer for the North Central Area and then Midwest Region. He retired in 2014 in Minnesota with his wife Linda.

BYLAW III: OFFICERS, REPRESENTATIVES, AND BOARDS – PROPOSED AMENDMENTS December 2021
{Proposed changes are shown by strike though and italic/bold font}

NOTE: Sections 3, and 5 thru 9 remain unchanged. The full Constitution and Bylaws for the Retirees' Organization can be reviewed at ConstitutionBylaws (wrdretirees.org)

Section 1. There shall be six elected National Officers consisting of President, Vice-President, Secretary, Treasurer, Newsletter Editor, and Archivist; and four elected Regional Representatives, each representing a geographical region like that used by the Water Resources Division during 1996. The elected officers shall constitute the Board. Each Region shall have a Regional Editor***, appointed by the Region's incumbent Regional Representative. The term of a Regional Editor shall be continuous until the incumbent vacates the position, and a new Regional Editor is appointed.*** The Newsletter Editor, Regional Editors and Layout Editor shall constitute an Editorial Board, chaired by the Newsletter Editor, whose purpose shall be to implement Newsletter policies and practices leading to optimal quality, accuracy, balance, and content of the Newsletter. The Newsletter Editor shall be responsible for the final content and composition, and for reproducing and distributing the Newsletter.

Section 2. ***National Officers and Regional Representatives shall be chosen from the membership by election.*** ~~Any vacancy shall be filled by the Board until the next election~~. ***The position of President shall be a 2-year term that can be renewed once through election, so a President may serve 4 consecutive years. The remaining positions are considered permanent and will come up for election, only if a vacancy occurs.***

Section 4. The Secretary shall keep the minutes of meetings of the Organization and of the Board, notify the members of their election, conduct appropriate correspondence, and keep membership records and other organizational files, all of which shall be open to inspection by the Board at reasonable times. ***The Secretary shall keep the minutes of meetings of the Organization and of the Board while actual minute taking may be delegated to any of the Board members.***

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(DETACH BALLOT HERE FOR MAILING OR SUBMIT ELECTRONICALLY)

MAIL TO: **Secretary, USGS Retirees**
P.O. Box 280 Herndon,
VA 20172-0280

OR EMAIL BALLOT COPY TO: wrdretirees2014@gmail.com

AMENDMENT TO: BYLAW III: OFFICERS, REPRESENTATIVES, AND BOARDS

Section 1:	**Approve ( )**	**Disapprove ( )**
Section 2:	**Approve ( )**	**Disapprove ( )**
Section 4:	**Approve ( )**	**Disapprove ( )**

Comments:

ELECTION OF USGS RETIREES' OFFICERS: 2022 – 2023 BIENNIUM BALLOT

Vote for one person for each National office and a Regional Director in **your** Region. Vote for either the nominee shown or another Retiree whose name you must enter in the blank space to the right of the nominee. Complete the ballot by placing an "X" in the parentheses to the right of that candidate. Print your name and provide your signature. Mail your completed Election Ballot to:

Your ballot must be received by December 20, 2021. A brief biographical sketch for each nominee appears on pages 6-7 of this Newsletter.

			Write-in Candidate(s)	
President:	**William 'Bill' Carswell**	( )	_____	( )
Vice President:	**Phil Turnipseed**	( )	_____	( )
Secretary:	**Kate Flynn**	( )	_____	( )
Treasurer:	**Cathy Hill**	( )	_____	( )
Archivist:	**Herb Freiberger**	( )	_____	( )
Newsletter Editor	**Jeff Stoner**	( )	_____	( )

Regional Director: **NOTE** -- vote **only** for the candidate in **your** Region

Northeastern:	**Norm Granneman**	( )	_____	( )
Southeastern:	**Ed Martin**	( )	_____	( )
Central:	**Bob Swanson**	( )	_____	( )
Western:	**Pat Tucci**	( )	_____	( )

Members Name: (Please print): _____
Members Signature: _____

Brief Highlights of the 2021 Hydrologic Data and Instrumentation Program
Herb Freiberger, Cathy Hill, & Dennis Sulam

Editor's note: *This article is part 2 of a two-part report (see May 2021 Newsletter NL191 for part 1) based on interviews of selected USGS employees and retirees. The authors are grateful to these dedicated people for sharing a taste of what is going on in USGS Water Science Centers across the nation. I believe you will be impressed with the technology, consistency, quality of data, and efficiencies sustained by the USGS employees.*

The changes in the Data Program in the last 25 years have been phenomenal. Discharge-measurement data are collected digitally, and provisionally approved and available almost immediately thanks to the data logger, QA/QC software programs, and internet connectivity from the field via cell phones. Bridge measurements are much safer since one can stand on the shoulder of the highway and deploy a tethered or remote-controlled boat with an Acoustic Doppler Current Profiler (ADCP) in the river to take the measurement. These types of measurements generally take 50 percent less time to make than current-meter measurements. Advances in software and the transmission of real-time data allow for hourly, or even 15-minute interval transmitting of data through a satellite to a database. There is much more focus on safety, minimizing the use of cableways, and confined spaces. The size of a gage house has been reduced to the point where a technician can install more than one gage house with equipment in one day. Stilling wells are no longer required and are being decommissioned. New technology is being developed all the time.

"Old Timers" who have worked with Automatic Digital Recorders (ADRs) and paper tapes earlier in their careers think the biggest change in the past 25 years is the Electronic Data Logger (EDL), which does away with the paper tape. All data are collected electronically. Others, who might be a bit younger and aren't aware of the ADRs but are familiar with current meters think the biggest change is the advent of hydroacoustic method, primarily the ADCP. Then, there are the youngest staff members who have never "counted clicks" and wouldn't know where to begin with anything other than an acoustic meter!

The use of the EDL did away with the ADRs and paper tapes. The EDL collects and records data from sensors and relays those data to a database through satellite. The data are then readily available for the technician to review from the office or home. As a result of almost immediate review of the record, missing data are rarely an issue anymore as the data are scrutinized every day for potential record failure. Most gages have real-time data updates on an hourly basis, although some update every 15 minutes or even randomly as warranted, such as for a flashy stream exhibiting rapid stage changes. As transmission rates have improved, more cooperators started looking for unit values. As they became used to pulling specific data they needed from the National Water Information System (NWIS), requests for data "the slow way" have been reduced significantly.

Hydroacoustic methods have almost eliminated the need for the mechanical current meter (Fig. 1). Water Science Centers (WSC) are using various types of acoustics to measure flow, such as the Flow-Tracker 2 or Acoustic Velocity Meter (AVM) that attach to the wading rod. The AVMs send a pulse out from the center of the sensor, which is scattered back to the 3 receivers. It measures velocity at a point, like a Price AA meter without the clicks. The ADCP gives a velocity profile, measuring velocity in bins near the surface to near the bottom of the river. These are generally used with a boat either manned, tethered, or remote-controlled. Another example of equipment being used in some WSCs is the EcoMapper Autonomous Underwater Vehicle which is operated remotely from the water edge. The EcoMapper is designed specifically for mapping water quality, water currents, and other water parameters and works best in large lakes. The choice is up to the WSC as long as the instrument has been QA'd by the Hydrologic Instrumentation Facility (HIF). There remain conditions, particularly in the western United States, where streamflow is turbulent such that acoustics will not work effectively. Hydrographers in such streams must rely on cableways, mechanical current meters, and 100-pound weights.

Figure 1 – Jim Barks (retired District Chief, Missouri) and son Shane Barks (Deputy, Missouri, Iowa, and Illinois WSC) show changes in streamflow measurement equipment.

The use of ADCPs has cut the time it takes to make a measurement of flow in half or even less. The ADCP requires no maintenance, just calibration, prior to putting it into the water. Using an ADCP by boat for flood measurements on large rivers, making two runs across the river (two across and two back) is like making four high-flow measurements. In addition, those four measurements tend to have a tighter scatter than the previous current meter measurements, so that one's confidence level in the accuracy of the measurement is higher.

Pressure transducers using compressed air are now used to monitor stage rather than mercury manometers, eliminating potential mercury spills and the need for heavy nitrogen tanks. Due to the use of newer technology, large stilling wells are used less and are being decommissioned. The stilling wells are confined spaces with the potential for methane gas buildup, and as such require implementation of air-circulation testing and other safety measures—a reason to reduce the number of stilling wells. Non-contact radar sensors are becoming more common for monitoring stage, with the development of a non-contact radar velocity sensor starting to be used in some locations. Many stream gages now have no equipment mounted in the water.

The Water Science Centers take safety very seriously. Some Centers have Safety Teams, and all have collateral duty safety officers. Most cableways have been dismantled over time or converted to bank-operated cableways (such as for tethers boats). There are exceptions, such as the Oregon and Washington Science Centers which each have about 100 cableways. These two Science Centers have many mountainous streams that can only be accessed safely by cableways. These WSCs have specific cableway inspectors who load-test their cables annually. There is a USGS cableway engineer also.

While we have focused on surface water, many WSCs also collect various water-quality parameters. For example, the Oregon WSC monitors temperature for fish health, various bridge scour parameters, and total dissolved gas downstream of hydro-electric dams since too much air from releases in the water is hazardous to the salmon population. The Ohio-Kentucky-Indiana WSC along with other WSCs have Super Gages that collect in addition to stage, water-quality parameters such as specific conductance, pH, water temperature, dissolved oxygen, turbidity, nitrate + nitrite, and fluorescent dissolved organic matter. Super gages are highly equipped with instrumentation that can collect as many water-quality parameters as methods are possible and that one can afford. They are very expensive to operate but can put out a tremendous amount of information. Most water-quality monitors are programmed to take samples through a storm. However, if for some reason, the monitor has not been programmed and the project chief knows it, he/she can use a smart phone to call the monitor from the office or home to take a sample. That luxury certainly wouldn't have happened 25 years ago! As far as groundwater goes, it was not specifically indicated, but it seems most of the work in that phase of the program is done in projects. In decades past, depth to water in an observation well was measured with a tape and chalk line which could be difficult or give false readings. That problem is solved today using improved electric tapes with graduated wire on a reel. Currently there are over 1800 sites across the country that transmit real-time groundwater data through electronic sensors.

ADCP measurements first go through an inhouse software program (Q Rev) that standardizes the data from the various vendor ADCPs used and helps the hydrographer determine the quality of the specific measurement. This step is done before the hydrographer leaves the site. For those who remember the ADAPS program, it has been totally replaced by AQUARIUS as the data processor. The hydrographer enters the discharge measurement into AQUARIUS and initially analyzes the data record. This can be achieved with the use of the internet before returning to the office. At this point the stage and discharge data are provisionally displayed on the web. The supervisor, or his/her designee, performs the second level of review. The data are then approved and considered published. These steps are to be completed within 150 days of data collection. A third level and last review is performed annually by a more senior person in the Hydrologic Data Section. This is now called an audit of the station record and is part of an internal technical review process. The Water Mission Area (previously known as Water Headquarters) will conduct an external audit of the WSCs internal audits every 3 years.

One Data Chief we interviewed stated “almost all of the advances in instrumentation we have been citing in this article could not have happened without the AQUARIUS software program.” We think he was correct. AQUARIUS is the most comprehensive and powerful piece of software the USGS data program has ever had. Developed by Aquatic Informatics of Canada (https://aquaticinformatics.com/customers/), the software was highly adapted to meet USGS needs. AQUARIUS, according to Aquatic Informatics, is the “world’s largest implementation of a commercial off-the-shelf hydrologic system ever.” The USGS has always published its standards documents, keeping them up to date with emerging technology. This means that any user of USGS standards compliant software, such as AQUARIUS, has the benefit of clear traceability to how any water data was collected. This has huge implications for increasing the compatibility of water data sets world-wide for agencies choosing to use AQUARIUS.

AQUARIUS gradually but totally replaced ADAPs in 2016-2017, although parts of it were used in the early 2000s. The result is “Gage to Page” data in minutes. The primary product of AQUARIUS is instantaneous values, using the International Standard for time-series data. The AQUARIUS platform adds and processes over 500,000 USGS data points per hour and publishes them to the National Water Information System (NWIS) for public access within minutes of transmission.

AQUARIUS also houses all our data bases including surface water, groundwater, water quality, and peak flows. These were all independent in the past. More features of AQUARIUS include: (1) a time series program that provides an intuitive interface for better quality control of data, enhanced rating curve development and verification, and provides the ability to derive better statistics reporting in real time, (2) a web browser that is easy to use while utilizing standard tools that help with rating curve creation and data corrections, (3) one platform for all data bases, and (4) ability for data checking, error detection, rating shift management, and detection of missing record (which this program has helped to become almost a non-issue). To reiterate, AQUARIUS is a very powerful tool.

Today’s USGS data sections have enacted a logical method of computing annual streamflow records, which they call “Continuous Record Processing (CRP).” No longer does any data section wait until the end of the water year to start computing records. As we mentioned above, CRP begins when the technician steps out of the water. In fact, the record for that 6- to 8-week field trip is completed with all information including shifts applied shortly after the discharge measurement is made and entered into the database and then puts out what everyone now seems to want—real time data. Some side benefits of the process are (1) real-time data, (2) data requests are down, (3) missing record is down by 90% or more, (4) all technicians are computing their own records, and (5) publishing of an annual data report has not been needed for the past 15 years. All data has been stored in NWIS and are available immediately to cooperators and the public as provisional data. And perhaps one of the best things has been there do not seem to be any complaints about no longer having an annual data report.

Almost all the Data Chiefs and Hydrologic Technicians we interviewed indicated a very large majority of the new entry level technicians they are hiring at this time have at least a bachelor’s degree and many have advanced degrees. This has resulted in a bitter-sweet situation where the new hires are excellent workers and well educated, but do not wish to remain in the technician series as a career as the full performance level of a hydrologist is higher. Many of them are being converted to hydrologists and many of them are leaving the USGS in about 2-4 years. So, there is some concern that the technician workforce may be a bit on the unstable side at this time.

So, what does the future hold in terms of instrumentation? Every interviewee said “non-contact gages or radar and more emphasis on real-time data.” Some said “nitrogen and phosphorus monitors that analyze nutrient

concentrations in real time." Additionally, there is an NWIS modernization project which will allow for a more interactive program. It was suggested by several interviewees that more work in tidal waters may be on the horizon. Doing more work with cell phones and cameras was suggested as areas to investigate. There is a trio of researchers in the MD-DE-DC WSC who are looking into "Artificial Intelligence" to determine the feasibility of using the history of record loss at stations (in their case water-quality monitors) to predict record failure before it happens, giving technicians the opportunity to repair the problem before it happens. The signals of equipment failure which might be a battery problem, history of power failures, equipment quirks or even algae on the probes would be sent by text message from the recorder to a project chief in the office daily. The hope is that one would know well in advance of the failure that a problem was forth coming.

As mentioned in our prior article, most employees are working from home due to COVID. The Technicians, who are prohibited from taking vehicles home to save time in the morning (actually no employee can take a vehicle home during COVID) come to the office to get their equipment and then head out to their field sites. When they come back, the vehicle must be thoroughly cleaned before the next trip. If a field trip requires 2 people, each person takes their own vehicle. One data chief recommended that the "work at home" concept be made permanent as an option for working. He went on to say that in the last year he has seen veteran technicians who initially were against "work at home" come 180 degrees around to love the program. WSCs generally have "zoom" all-hands meetings monthly, and Data Sections have them more frequently. Additionally, the Water Mission Area hosts many webinars, generally at least one a week. Prior to COVID, technical training was often hosted by specific WSCs, and employees would travel from nearby WSCs to attend.

During the past 25 years, many WSCs have experienced large influxes in their data programs. For instance, the Washington and Oregon data programs today are both between $7-8 million dollars. In the early 2000's, those numbers would have been the same as a fairly large total District/WSC. The MD/DE/DC data program is currently $6-7 million dollars which reflects an increase of stream gaging stations of about 50 during the last 25 years.

In summary, the advances in hydrologic equipment have been mind boggling and rapidly occurring in the last 25 years compared to the prior 50 years or so. In the old days, Hydrologic Data Chiefs and Hydrologic Technicians used terms such as current meters, base and boom, 100-pound weights, hand lines, ADR punch tapes, discharge note sheets, stop watches, rapidograph pens, hand-drawn rating curves and hydrographs, form 9-207's and 9-192's, annual-data report, stilling wells, and cableways. During the last 25 years, in what seems like overnight, those terms have been replaced with acoustic velocity meter, acoustic Doppler current profiler, everything computer drawn, real-time data, ADAPS, and now AQUARIUS, data logger, EcoMapper, non-contact radar, working at home, and streamflow audits. And the future is wide open! We would like to thank the Hydrologic Data Chiefs and the Hydrologic Technicians who spent time explaining what life is like now in the world of collecting and reporting on hydrologic data. Please keep your "high big-boy waders" on as there may be more dramatic changes before this report goes to press!

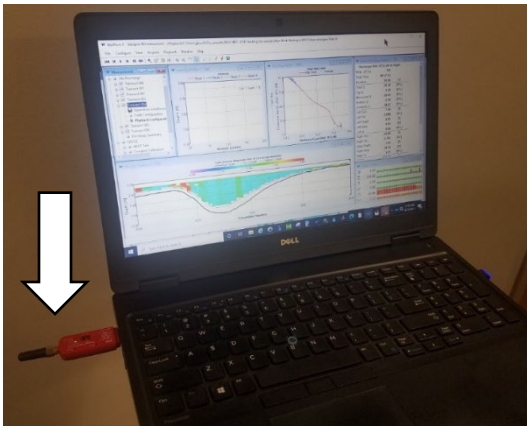
Photos of current (2021) USGS deployed equipment and described by Jeff Kvech.

A Sutron Accububble bubbler system. This (and a couple of other makes/models) replaced nitrogen tanks, Cono flow site-feed systems, and mercury manometers. Equipment employs air pump and precisely regulates forward pressure through a bubbler line and orifice, and senses back-pressure changes to recognize direction and magnitude of water-level changes.

A Sutron Satlink2 Data Collection Platform (DCP) data logger with integral satellite radio. We can hook up a wide variety of sensors to this logger and routinely transmit data hourly.

A Sontek Flowtracker1 acoustic doppler velocimeter (ADV) with hand-set keypad and display which can be mounted on a traditional wading rod. We key in some station ID information to get a measurement file started, set up a tagline, do some basic QA/QC testing, such as water temperature comparison of independent thermometer with the unit's thermistor, and then enter sub-section information as we start and progress through a cross-sectional wading measurement, very much like when using a mechanical meter. For each sub-section, we enter location and water depth. If it's deeper than 1.5 ft, we collect 40 seconds of flow velocity data at 0.2 and 0.8 depths. If it's 1.5 ft or shallower, we collect 40 seconds of data at 0.6 depth. The yellow circular face in center/bottom on the wand is the sound waves emitting transducer and the two receivers on the ends of the arms. The unit senses velocity by sensing sound reflected from particles moving in the flow. It measures pure velocity, like a mechanical meter, and the vector data, so we get just the downstream component for calculation of flow, without the sideways vector components. It accounts for horizontal angle adjustments typically done manually with an AA or pygmy meter. In deployment, we have the tips of the sensor arms lined up perpendicular to the tagline and let the ADV recognize any horizontal angles as it does the math for us. As we proceed across the channel, the ADV can send us error messages, so we might re-collect a sub-section of data or add a velocity measurement at 0.6 depth to the 0.2/0.8 depth data we just collected if the velocities were outside of what we might expect. For example, if we found higher velocities at bottom than top, we'd add 0.6 depth measurement to the subsection to resolve better mean velocity in that column of water. The unit computes the total flow when we're done, and we can store that in the unit and download it later for processing and inclusion in the digital field visit data file.

RDI RiverRay Acoustic Doppler Current Profiler (ADCP) with GPS. The center pontoon houses the electronics, including a Bluetooth radio transmitter/receiver, so we do not need to be electronically cabled to this equipment in the water. We'll deploy this unit from the downstream side of a bridge or from a line strung across a channel. Floating on the surface, the unit is much less likely to snag on and become fouled by debris in flow. In the ADCPs that we have, the sound emitting transducer face is also the sensor face that picks up reflected sound. It basically rapidly emits signal and shuts up so it can hear, then repeats. It recognizes the empathic reflection of sounds off the river bottom, and so recognizes the depth at that point. It uses the data reflections from the river bottom to track unit motion. It uses the doppler-shifted frequency information in the data to tell if the bottom is moving upstream ward or downstream ward or left or right relative to itself. In this way, it can 'bottom-track' to know where it is always. We can also use the GPS unit to collect locational information using satellites. This is very useful in situations where the riverbed materials are moving with the water flow. It eliminates the 'moving-bed' effect on the flow measurement.



Computer display of a cross-section of data collected using an ADCP. This is RDI WinRiver2 software, which has many options for display, both graphical and tabular. The lower-left portion of the screen shows the cross-section with river bottom, water surface, and variously colored cells in section that indicate mean velocity. The 'empty spaces' just below the water surface and just above the river bottom are areas where the ADCP cannot sense useful data. For those conditions, we have software to help us utilize and extrapolate the decent data we get to estimate flows for top, bottom, and both side edges. The red attachment on the left side of the laptop is a Bluetooth radio antenna, used to communicate wirelessly with the ADCP.

Cathy Hill, Dennis Sulam and I (Herb Freiberger) have written two “for information” articles in recent issues of the Retirees newsletter. The first article was in the May 2021 (NL191) issue and was concerned with the latest reorganization of the U.S. Geological Survey, implemented in 2016-17; the second is the above article in this issue, the November 2021 issue and is about changes in the Hydrologic Data Programs of the Water Science Centers and changes in instrumentation used in those programs in the last 35 years. We are taking this opportunity to thank the 16 current and some retired employees for taking their time to let us interview them about these topics. Their up-to-date knowledge and expertise made these articles possible. Interviewees were:

Bill Guertal Reston, VA	Shane Barks Rolla, MO	Dan Hippe (Retired) Oakton, VA
Jeff Kvech Baltimore, MD	Jim Nicholas (Retired) Shelby, MI	Keith Overton Portland, OR
Cindi Barton Tacoma, WA	Scott Deweese Portland, OR	Mark Bennett Richmond, VA
Jeff Woods Indianapolis, IN	Andy Zieglar Lawrence, KS	Shawn LeMaster Louisville, KY
Bob Joseph Austin, TX	Russ Lotspeich Richmond, VA	Holly Wyers Raleigh, NC
Robert Mason Reston, VA		

Use of brand names in this report does not represent USGS endorsements of specific manufacturers.

Screen shot from Hydrologic Technicians Facebook page – by Scott Perrien, Supervisory Hydro Technician, Lower Mississippi- Gulf Water Science Center

Not every day you get a picture of a destroyed gage from Hurricane Ida fully intact, but now located 5 miles from the original gaging location.

2021 USGS RETIREES' SCHOLARSHIP WINNERS

On Wednesday (April 7), the U.S. Geological Survey (USGS) Retirees' Organization announced the winners of the 2021 Scholarship Program.

Six 2021 Scholarships were awarded bringing the total awards to $80,678 since 2006.

"The USGS Retirees' Organization Scholarship Program has been a remarkable success over the years, and we are so pleased to have 6 winners in 2021," said **Pete Anttila**, President of the USGS Retirees' Organization. "We hope this program will continue to grow to provide job-related educational opportunities to the early career scientists and engineers in the USGS."

Gary Burke (OK-TX Water Science Center in Lubbock, TX - $1150) attending Wayland Baptist University. I want to express my sincere appreciation for being awarded a USGS Retirees Scholarship this year. This scholarship has allowed me to take Calculus 1 this semester online through the UC Berkeley Extension program. This coursework is helping me close the gap towards becoming eligible for the hydrologist series. I have been with the USGS Water Science Center in Texas for 17 years. I am currently serving in a field office chief role (supervisory hydrologic technician) in the Lubbock, Texas area. It has been a real joy to show my 4 homeschooled boys ages 15, 12, 10, and 7 that their dad knows how to study, after work, in the evenings. My wife Jennifer is being incredibly supportive. She has been a huge support throughout my whole career. Calculus classwork in the evenings pale in comparison to chasing high flow measurements on 50 and 100 year floods. Thanks to all the Retirees who made this scholarship possible.

Shelby Daniel (South Atlantic Water Science Center in Norcross, GA - $2000) attending the University of Oklahoma. Shelby grew up in Jacksonville Beach, FL. She received her undergraduate degree in Water and Soil Resources at the University of Georgia and is now pursuing a master's degree in Hydrology and Water Security at the University of Oklahoma. She began working for the USGS in the South Atlantic Water Science Center's Norcross Office in 2016. Her main duties include monitoring surface water stream gages within the Ocmulgee and Flint River basins. She is also a member of her Center's Hydroacoustics Working Group, whose responsibilities include testing new acoustic equipment. Shelby found hurricane storm surge deployments particularly rewarding. She said on her application that, "it was readily apparent how important the storm surge data is for understanding and responding to hurricanes in the future." She also stated in her application that, "Working at the Survey has given me more opportunities than I could have ever dreamed of, and I have learned so much in the four short years that I have been working for the USGS."

Noel Deyette (NY Water Science Center in Troy, NY - $1500) attending the University of Oklahoma - Gallogly College of Engineering. I have worked for the USGS in Troy, NY in some capacity since spring 2012. I started as a volunteer working on electrofishing surveys, and then continued my work as a contractor and term employee working in the field and laboratory. I enjoy working in the field collecting water quality samples, measuring discharge and working in the soil and water low-ionic strength laboratory. I assist with sediment sampling during high flow storm events. I am the QMS center champion and the QA officer liaison for the lab. Additionally, and closest to my heart, I am the NYWSC campaign manager for the Combined Federal Campaign. Online giving starts September 1, 2021 and the campaign officially opens October 1st! In January 2021, I began working on my master's degree through the University of Oklahoma studying Hydrology and Water Security under the Water Management specialization. This degree is helping me to further my understanding of the research I assist with and strengthen my skills. This fall I am taking a course on Water Policy and Climate Change and Water Sustainability. I am scheduled to complete the program next summer. I look forward to continuing my career with the USGS and seeing what new paths open to me in the future.

Heather Manzi (CA Water Science Center in Truckee, CA - $500) attending California Community College. I started with the USGS in 1999 as a Hydrologic Aid. I have been a Hydrologic Technician for approximately twenty years. I have always found fulfillment in working for the USGS. While life may change in many unexpected ways this career has been a constant. Satisfaction from this career has come in many different forms through the years; mentorship, developmental trainings and workshops, professional collaboration, a sense of belonging and purpose, and the feeling that my work is contributing to something bigger. I have performed a wide range of duties during my career with the USGS. I've had the opportunity to explore remote mountain lakes and streams, measure water quality of hydrothermal springs, assisted in the collection of biological data to assess the effects of urban development on urban streams, and assisted with the collection of record-breaking high flow discharge measurements during extreme flooding events. Currently, I am responsible for monitoring two networks. The first area consists of a water quality network in Long Valley Caldera. The USGS monitors the quality and quantity of hydrothermal water through Hot Creek and other surface features across the caldera. The second project is a surface water monitoring network in Leviathan Mine. Leviathan Mine is superfund site at an inactive open-pit sulfur mine. There are seven surface water sites in the mine. The USGS provides ongoing surface water flow monitoring. In addition to the O&M sites that are Analyzed, Approved, or Audited I review and publish over fifty Furnished FERC records for the Truckee Field Office of the California WSC. Currently I am enrolled at San Diego Community College. I need to complete two Physics and Calculus courses for eligibility to be converted to a Hydrologist.

Madelyn Messner (OH-KY-IN Water Science Center in Indianapolis, IN - $753) attending Ivy Tech University. I am currently a Hydrologic Technician with the Hydrologic Networks Section in Indianapolis, IN. My journey to the USGS began when I decided to go to graduate school after getting my BS in Biology and working a few jobs in conservation science and environmental education in my home state of Ohio. I studied environmental predictors of freshwater parasites in Michigan inland lakes and completed my Master's thesis in 2017. I knew that I wanted to work in natural resource management, research, or anything that allowed me to work outside and contribute to science, so I accepted a seasonal Hydro Tech position with the Bureau of Land Management in Grants Pass, OR. In Oregon, I spent a lot of time hiking timber units to identify and map hydrologic resources such as wetlands, springs, and intermittent streams to update the National Hydrography Dataset. I also gained experience doing cross-sectional and longitudinal surveys of streams and designing log placement sites to promote salmon spawning habitat (gravel beds). After this first exposure to the world of federal employment, I knew that I needed to keep moving and applying to find a permanent position. The next season I was hired on as a Wildlife Technician for the US Forest Service in the Black Hills National Forest, where I conducted wildlife surveys and identified critical habitat areas for goshawks and other raptors, along with sensitive amphibians, reptiles, and mammals. After the season in the Black Hills, I applied to the Hydro Tech job in Indianapolis and was lucky enough that my graduate education meant that I could still apply to the Recent Grad position. I finally found my way into the USGS and could not be happier with how things are going. For the last 2.5 years I have embraced the duties that come with being a Hydro Tech for the USGS and have jumped at any opportunities for professional growth. I perform routine visits to surface water and groundwater sites and have been helping the Ecosystems Science section with continuous water-quality site visits. I have also assisted the Ecosystems section with some turbidity data analysis and hope to publish my first USGS report with them this year. I assist in training new technicians within our Center and help colleagues navigate resources that are offered to them through the USGS and DOI as a Peer Support Worker. This summer (2021), I completed the Motorboat Operator Certification Course down in Louisville, KY and had a blast driving boats on the Ohio River. Thanks to your generous scholarship, I am currently working through what I hope is the last college course I'll ever need to take: Calculus II! I am hoping that by adding this course to my transcript I will be qualified to apply for Hydrologist positions and leadership roles later in my career. Thank you for maintaining this scholarship fund, for your legacy and for inspiring the next generation of USGS scientists.

Shannon Pace (VA-WV Water Science Center in Richmond, VA - $1500) attending The Ohio State University. Thank you all for making this possible. I interned with the USGS in college (George Mason University Honors College) in Reston, VA from October 2014 through October 2015 (1 year). I joined the Richmond, VA Water Science Center as a Hydrotech October 2017, and I worked through July 2020 (2 years and 9 months), when I moved to start my MS degree. The best experiences I have had with my group at the USGS have been on our hardest field days. I joined the group during the start of the Pipeline Monitoring Network, which allowed me to be present for the site installations. We had many long field days, but I was able to learn the ins and outs of a field site, how to set one up, how to fix and troubleshoot faulty equipment, and how to always be flexible! I love the constant challenge that my job provides – no site visit is ever the same. Throughout my experience as a hydrotech, I have worked as a positive, professional member of a team, sought help and guidance when I needed it, and served as a leader. After graduating college in May of 2016, I was offered a position in environmental consulting as a Junior Environmental Scientist. My group focused on site remediation of gasoline stations throughout the state of New Jersey. We observed underground storage tank removal, collected soil and groundwater samples, and calculated classification exception areas. During this time, I improved my technical writing skills while I gained experience in the industry beyond research. When the USGS contacted me with a job opening in the summer of 2017, I jumped at the opportunity! I love that the field work and quality control of data that I complete can lead to a better understanding of hydrologic conditions and water quality. I look forward to seeing the societal change in the years to come. I love my job because the work is difficult, challenging, and rewarding. Throughout my time with the USGS, I determined that I want to continue to research the impact of ecosystem and land use change on hydrologic conditions and water quality over varying scales. To continue to grow as a researcher and scientist, it is critical that I continue my education. I am planning to work for the USGS as a project scientist after completing my MS degree.

A detailed list of prior and current year winners can be located at: Scholarships (wrdretirees.org)

To learn more about the USGS Retirees' Organization and the associated Scholarship Program visit **http://wrdretirees.org** or contact D. Phil Turnipseed **(Phil.Turnipseed@gmail.com)** for more information.

YEAR	NUMBER of AWARDEES	AMOUNT	REMARKS
2021	6	7403	
2020	7	7575	
2019	2	4000	
2018	5	8700	
2017	0	0	No awards were made this year
2016	3	6000	
2015	2	7000	
2014	2	8000	
2013	0	0	Summer Hiring Freeze
2012	3	10000	
2011	4	10000	
2010	2	5000	
2009	2	2500	
2008	1	1500	
2007	1	1500	
2006	1	1500	
TOTAL:	**41**	**$80,678**	

2021 – SCHOLARSHIP WINNERS – NOTES OF THANKS

The Retirees' received multiple notes of 'thanks' from the 2021 winners which expressed their appreciation for consideration and award of a scholarship.

UPDATE HYDROLOGIC TECHNICIAN WINNER 2020

Matt Hardebeck, Indiana Water Science Center: Thank you Norm and Cathy, and all USGS Retirees for selecting me as a recipient for the USGS Retirees Scholarship for use in attaining the remaining Physics credits needed for eligibility as a Hydrologist. I had enrolled in an online Physics course at a local community college here in Indiana, Ivy Tech, in late March of 2021. I finished the course just about two weeks ago (in fact, I submitted the online final the day before I went to the hospital with my wife for the delivery of our newborn son, Michael) and I received the final grade recently. I had gotten a 98% in the course, which is not only evident of a passing grade, but I believe it may have been the highest grade for that particular course during that part of the year! So again, thank you Cathy, Norm, and all USGS Retirees for the scholarship and the belief that I could succeed in this particular discipline! If need be, I can supply an unofficial transcript of this particular course as well. Thank you USGS Retirees!

RETIREMENTS

Kent Becher is retiring on August 28, 2021. Please help me congratulate Kent on his career and wish him well as he begins to enjoy his retirement. After 33 plus years with the USGS, Kent Becher has decided to head off into retirement. Kent graduated with a degree in geology from the University of Northern Colorado and started as a term employee at the USGS office in his hometown of Pueblo, Colorado. He worked on the Pueblo Reservoir mine drainage study and received his first introduction to QWDATA. He accepted a hydrologic technician position in Casper, Wyoming where he was introduced to the backbone of the USGS in the collection of hydrologic data. He converted to hydrologist and started his first study called evaluation of retrofit edge drains on highways with the Department of Transportation. Then he had a career changing moment where he was asked to help sample groundwater on a new Installation Restoration Program (IRP) at F.E. Warren Air Force Base in Cheyenne, Wy. He transferred to the Cheyenne office soon after to work on the IRP full time. The late Marv Crist and Tom Quinn were great mentors to Kent during this time. Kent served as field team leader for the project and authored and co-authored many work plans, sampling and analysis plans, remedial investigations, and other administrative reports. In 1996, the Air Force decided to use a consultant and the IRP ended at F.E. Warren Air Force Base, so the USGS had to move many employees to different water science centers. Kent was transferred to Iowa City, IA where he worked on the National Water Quality Assessment Program (NAWQA). Kent worked for Steve Kalkhoff in Iowa and was another great mentor to Kent. Steve Kalkhoff and Dana Kolpin taught Kent how to use SAS which Kent used for NAWQA and database duties. Steve and Dana also taught Kent about nutrients, pesticides (metabolites), and emerging contaminants. Eventually Kent was asked to serve as central region NAWQA Data Synthesis representative when the EIWA database was recognized as being one of the better ones in NAWQA. That position also led to Kent being on the QWDATA National test team for several years. During his time in Iowa, Kent authored and co-authored several NAWQA reports. Kent met an USGS administrative assistant in Iowa named Kandis when he moved to Iowa who became Kent's spouse. Due to Kent's experience with environmental sites from his work at F.E. Warren it led to a study with oil/water separators for the U.S. Army Reserve units in Iowa, Kansas, and Nebraska. Kent called the new director in Nebraska which happened to be Bob Joseph to set up the project. Soon after that Bob Joseph became the director of Texas. Bob Joseph later contacted Kent and asked if he would be interested in moving to Texas to help develop program in Fort Worth. Kent's first job in Fort Worth was to get the water-quality program back on track. Kent introduced the Fort Worth office and the WSC to PCFF which made water-quality collection and entry more efficient. About a year after coming to Texas Kent was asked to be the acting water-quality specialist which later led to becoming the water-quality specialist for the WSC. About a year later Kent was asked to be the acting EPA Region 6 technical liaison after a retirement and again that led to becoming the full-time EPA liaison. The year and half as being both the water-quality specialist and EPA liaison was quite the challenge. Kent was the EPA Region 6 liaison for the past 15 years and during that time became the water-specialist a second time (2 years) and was the Air Force liaison for one year. The EPA program is growing and Kent is very proud of that program. Kent was honored in being an employee of the USGS and is so thankful to so many colleagues who taught him so much. There are just too many people to name and thank in his career. Kent will miss the science and the many great colleagues and friends he made at the USGS and EPA over the years. Kent plans to rejuvenate for a few months after retirement and then see where life takes him. He has plans to do charity work, travel, fishing, hiking, sports and more sports, spend time with family and friends, eventually build on his acreage in Colorado, and maybe even do some part time environmental consulting.

-Tim H. Raines, P.E., Director, Oklahoma-Texas Water Science Center

Please join me in congratulating **Candice Bostwick** on 40 years of service with the USGS and wish her happiness and new adventures as she moves forward into retirement on July 31, 2021. Throughout her career, Candy has exhibited passion, dedication, and a deep knowledge in keeping critical information flowing to the public, scientists, partnering agencies, and emergency responders. Candy's career has traversed an evolution of technology changes without wavering in her responsibilities to the USGS mission to deliver water data through NWIS, NWISWeb, and Internet of Water products. Candy started working in 1980 as a Geologic Field Assistant (GFA) with USGS Branch of Atlantic and Marine Geology (BAMG) in Woods Hole, MA, while finishing her Bachelor of Science in

Geochemistry from Bridgewater State College. In 1981, she joined the USGS full time and worked with Frank Manheim and John Hathaway, compiling data and coauthoring on several Circum-Pacific Maps, IMAPs, Open-File Reports, and journal articles (Search Results - USGS Publications Warehouse). This position enabled her to travel and participate in deep sea exploration of manganese nodules in the Atlantic and Pacific oceans. Her interests in data and databases, and experience in Ingres particularly, led her to apply for and accept a position with NWIS on the database redesign team in Reston, Virginia a year later. In 2000, Candy accepted a position with NWISWeb (Waterdata for the Nation) to be part of an exciting team to get USGS water data holdings on the web. She led the MySQL public database effort for the team and soon became the Operations Team lead responsible for the high data availability and reliability to serve these mission critical data to the public. She was also responsible for support of the NWISWeb system which meant many late nights and long weekends over the years. These responsibilities continue through the present and have been executed with dedication and resilience while navigating through multiple reorganizations and the evolution of Water Mission Area data delivery with the adoption of AQUARIUS Time-Series (AQTS) and as NWISWeb merges its functionality into the Internet of Water team. As part of the 2018 Water Mission Area reorganization, Candy was placed in the Enterprise Technology Office (ETO). She became part of the Enterprise Services team as of a 2021 ETO reorganization where she has contributed to the adoption of ITIL process and service development that will help move Operations and Application Support forward. Candy's recent efforts include the continued support of NWISWeb and acting as a liaison between NWISWeb Legacy and Internet of Water teams as the redesign proceeds. Her in-depth knowledge and experience have not only been an asset to NWISWeb but also for migration of Legacy NWIS data into AQTS, with the migration of the NWIS SITEFILE data into Monitoring Locations Registry (MLR), and with getting Site Visits, Peaks and Groundwater Level data to AQTS. During this time, Candy has been an integral part of the ETO Application Support to NWIS AQTS software and the delivery of these data to NWISWeb. While Candy has missed the high seas since she left Woods Hole and probably did not plan to live in Virginia longer than she did in Massachusetts when she took that temporary job with NWIS, we are extremely grateful that things worked out and she was able to be part of our Water family for so many years. Candy plans to travel, spend more time with her sons, Robert and John, and with her passion for music and performing, she will have more time to dedicate her efforts towards the arts, as she says farewell to a long and successful career with USGS. We will miss you!!! With her passion for music and performing, she will dedicate more time towards the arts. All her colleagues wish her the best on this next chapter in her life. Candy, thank you for everything you have done. We will miss you!!!!

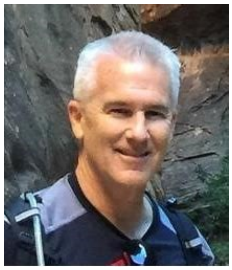
-Morgan A. Schneider, Deputy Chief, Enterprise Technology Office (ETO), End User and Lab Support Lead (Acting), Co-Located with the Wisconsin Water Science Center

Mark Brigham writes: It is with great pleasure, and a bit of sadness as well, that I'm retiring from the USGS September 13, 2021. After completing a BA in Chemistry and MS in Civil Engineering at the University of Minnesota, I was hired to work on the Red River of the North (REDN) NAWQA project. While I contemplated staying in school to earn a PhD, I felt an itch to move on, and begin a career. I made the right call. It's hard to imagine a better "first real job" than working on the NAWQA project. Especially the first-round studies, which had both a nationally driven emphasis and some flexibility to pursue locally important initiatives. It was a truly rewarding experience to work on an inter-disciplinary team within the Center, and connect with peers, mentors, and experts throughout the USGS. Although my MS research was on mercury, the first few years with the USGS I worked on seemingly every water chemistry issue *except* mercury. But late in the REDN study, mercury's magnetic properties drew me back in. Through the remainder of my career, while I dabbled in CECs, pesticides, sediment transport, and other issues, studies of mercury in aquatic ecosystems always seemed to be in the mix. When Cycle 2 of NAWQA began, I was fortunate to lead the Mercury Topical Team. I was doubly fortunate to collaborate with such wonderful people and accomplished scientists, both within the Science Centers and across the agency. I did have some non-NAWQA career highlights as well. In 2000, I began studying mercury in remote lakes in Voyageurs National Park. The field work was awesome. The project developed into a suite of projects, with collaborating scientists from Geologic Division and Biological Resources Division, the National Park Service, Minnesota Pollution Control Agency, and UW LaCrosse. Twenty-one years later, the USGS and NPS still collaborate to monitor several of the initial study lakes—one of the longest-term, low-level aqueous methylmercury data sets in existence. As I reflect on

thirty years, I have some pride in what I've accomplished, and the fact that some reports and papers I played a part in have helped move the needle in managing our waters and keeping them clean. I consider myself lucky to have worked for the USGS, particularly because of all the great people I've been privileged to collaborate with over the years. I have enjoyed my career immensely, but I have always wanted to do some things in retirement while I'm still young and healthy enough to do them. In retirement, I plan to travel with my wife, and pursue as many interests as possible: bicycling & bicycle touring, hiking & backpacking, photography, writing, cooking, fishing and foraging, canoeing, etc. I also plan to work as an emeritus scientist for a while, to help wrap up some ongoing projects. I plan to volunteer at some non-profits that are near and dear to my heart, and perhaps see if I can move the needle on issues related to climate change & clean energy. I'd love to stay in touch with friends and colleagues. You can reach me at mbrigham64@gmail.com. I also post occasional photos from my adventures to the InstaGram @markiebrigham. See you on the trails.

Rick Dinicola started his USGS history in 1980 as a student working with George Leavesly in Colorado on his new Precipitation Runoff Modeling System. After graduate school, he joined USGS in 1983 at the Colorado District as a Hydrologic Field Assistant, and soon after joined the Pacific Northwest District, Washington Office (now the Washington Water Science Center (WAWSC)) as a hydrologist. After a brief stint in the Tacoma Field Office, he dove into the Studies program with the Mt. Baker Mudflow Hazards project and the Metropolitan Small Basins Runoff project. In 1986 he received a Special Achievement Award for his rainfall-runoff modeling that remains at the core of the state's widely used Western Washington Rainfall Runoff model. Rick soon became a scientific leader in the fields of surface-water modeling, surface-water/groundwater interactions, and groundwater contaminant bioremediation. In 1995, he became coordinator of WAWSC program with the U.S. Navy where he conducted and oversaw projects concerning contaminant transport and bioremediation at Department of Defense facilities throughout the northwest. Rick also had the opportunity to travel to the Philippines and work with their Volcano Observatory scientists on prediction approaches to debris flows from post-eruption Mount Pinatubo. In 2005, he was appointed as the WAWSC Groundwater Specialist, helped launch an assessment of the Columbia Plateau Regional Aquifer, and coordinated USGS technical assistance to EPA at the Hanford Nuclear Facility. In 2009, he essentially hung up his waders and was promoted to Associate Center Director for Hydrologic Investigations. In this role he has provided leadership to ensure that the WAWSC continues to be a premier hydrologic research center in the State of Washington. His success at formulating and managing science is due in large part to his outstanding communication skills that enabled him to get the best from Center scientists and to develop strong partnerships with community water managers. His interagency coordination related to Puget Sound recovery, NRDA activities at the Upper Columbia/Lake Roosevelt site, and the Columbia River Basin Federal workgroups has brought significant USGS water science to meet partner needs. He has shown versatility in his expertise, exceptional judgment in working with others, and has developed projects that show ingenuity and creativity. As a result of his dedication to delivering high quality science to the Washington water resources community, while demonstrating outstanding communication with co-workers and cooperators alike, he has earned the respect of his colleagues in the USGS and throughout the State of Washington. Please join with the WAWSC in thanking Rick for all his many contributions to the mission of the USGS and wishing him a long healthy and happy retirement. Rick's last day as a permanent employee is September 30th but Rick will work as a volunteer for some months in order to finish some activities critical to the Center. Due to the pandemic no party has been scheduled at this time, but please contact Rick at dinicola@usgs.gov to express your congratulations or better yet, join him on a bike ride or mid-week ski!

-Dr. Cynthia Barton; Science Center Director*, USGS, Washington Water Science *Center



Please join the Office of Planning and Programming (OPP) in extending best wishes to Pat Lambert who is planning to retire after 37 years of USGS service at the end of August 2021. Pat began his USGS career as a Student Hydrologic Technician with the Utah District in 1985 while completing his Bachelor of Science degree in Geophysics at the University of Utah. Upon completion of his degree, he joined the USGS full time as a Hydrologist and began investigating groundwater resources around the state. Pat developed conceptual and MODFLOW models of the Central Sevier, Tooele (Too-will-ah), and Salt Lake Valleys as well as other areas in the state. Several of these models are still commonly

referenced and used as baseline comparisons for current investigations. In 1997 Pat was selected as the Assistant District Chief (Hydrologic Investigations Section Chief) of the Idaho District and made the move with his young family to Boise. In this leadership position he was able to influence the direction of the District Science, GIS, and the Northern Rockies NAWQA programs. In 2003, Pat was selected to be the Director of the Utah Water Science Center and made the move back to Salt Lake City. He led the Center to consistently be recognized as one of the best managed centers in the USGS. He hired and mentored many staff that have gone on to have distinguished careers. Also, the Center softball team experienced its best era and won several Research Park League Championships. At this time, he also became the USGS representative to the Colorado River Salinity Control Forum and was instrumental in developing relevant science that was beneficial to the group and participated as a savvy technical adviser to all the other Federal and State representatives involved in the Salinity Control Program. In 2014 he accepted a position as the Federal Liaison to the Western States Water Council. In this important position he worked jointly with Federal agencies to formulate, evaluate, and promote new concepts, methods, and practices to improve the development and execution of Federal State water policies and programs. It was also during this time that Pat completed his Master's degree at Utah State University. In 2016 Pat accepted the position as the Rocky Mountain Region Science Coordinator. In this position he worked on best practices for science exchange and resource sharing among the regions Science Centers. He also worked to ensure that the Regions science programs were meeting the needs of key Federal, State, and Tribal stakeholders. In 2019 Pat moved to his current position in the Office of Planning and Programming as the Integrated Water Availability Assessments Program Manager. In this role, Pat leveraged his careers worth of leadership skills to launch this new program. He worked with a cross-mission area group to develop the IWAAs strategy and oversaw the transition of several activities. His willingness to engage in many levels of planning and development have been a great asset to OPP and will be missed. USGS, Water Resources Mission Area, and the OPP Program are appreciative of Pat's commitment to the organization's vision, mission, and values throughout his career. Pat's expertise, Program leadership, and knowledge will be missed by many as he begins this new chapter of his life. In retirement, Pat plans to spend more time with family – kids and grandkids living a far, spend more time in the gym, practicing the piano, writing thoughtful movie reviews, improving his cooking skills, and preparing for a brief boxing career to carry on the Lambert boxing legacy in Utah.

-Carise Barbour, Budget Support Team Lead, U.S. Geological Survey, Office of Planning and Programming

Jonathan 'Jon' Nelson retired from his 36-year career with the USGS on September 30, 2021. After growing up on a farm near Black Diamond, WA as one of seven children, he received his Bachelor of Science in Physics at the University of Puget Sound and Master's and Ph.D. in Geophysics at the University of Washington. He was hired by the USGS while still in grad school in early 1986 and spent his entire career with the National Research Program in Colorado. His research concentrated on the physics of river morphodynamics from sediment grain to landscape scales through a combination of field, laboratory, and computational work. Over his career and 150+ publications, he balanced research work with applications on rivers in the U.S. and around the world, including on the Colorado, Kootenai, Platte, Trinity, Klamath, Mississippi, Missouri, Detroit, Snake, Delaware, Potomac, Mekong (Vietnam, Laos, Thailand), Red (Vietnam), Kosi (Nepal, India), Nile (Egypt), Magdalena (Colombia), Mahaweli Ganga (Sri Lanka) and countless other smaller rivers and streams. In the mid-2000s, he was asked by NRP to share his existing computational codes to develop a user-friendly river modeling package for scientists in the WSCs and outside the USGS. What began as a small USGS effort grew through Nelson's efforts in enlisting international colleagues into what is now the iRIC river modeling package, with many international collaborators, more than 20 1-, 2-, and 3-dimensional computational solvers, and over 30,000 registered users worldwide. Over the past 15 years, Nelson and colleagues taught over 150 short courses to USGS staff and to students and practitioners in over 40 countries. He says this teaching and his interactions with all the great USGS people were the most rewarding aspects of his career—he hopes to continue both activities. Retirement? Jon will take a holiday on October 1st and then start a new position the following Monday with an NGO specializing in educational and modeling support for river problems around the world. He will be joined with his long-time friend and iRIC co-developer Prof. Yasuyuki Shimizu from Hokkaido University along with several other colleagues in this work, which will include continued support for iRIC development. First projects will be on the Brahmaputra near Dhaka and the Irrawaddy from Mandalay to Yangon. Retirement won't be all work though. Jon looks forward to spending more time with his wife and 5 children at their Leyden

Creek Farm in Arvada CO, catching up on farm work and maintaining his collection of unusual cars, including the 1959 Alfa Romeo Giulietta Spider Veloce he bought at a garage sale 43 years ago. He'll also spend 3-4 months a year overseas at homes/offices in Asia and Europe (Bangkok and Barcelona- always a party!). He can be reached at his personal email: jmn600lt@gmail.com.

After more than 35 years with the USGS, **Doug Ott**, Idaho Water Science Center Boise Field Office Chief, has decided to retire at the end of July 2021. He will leave some very large and difficult shoes to fill (size 15)! Doug graduated from Vermilion College, Ely, Minnesota, with an associate degree in water resources in 1985. That same year he joined the USGS on a term appointment as a hydrologic technician in what was at the time the Kentucky District, working 2 years in the Louisville, KY field office. In 1987, the opportunity of a career position with the USGS took Doug to Iowa where he spent the next 3 years in the Iowa City field office running a surface water field trip and providing field support to several water-quality studies. In 1990, having always wanted to live in the West, Doug relocated to Idaho where he joined the USGS project office at the Idaho National Laboratory in eastern Idaho. Hired as a drill rig assistant, Doug quickly discovered that a career that left him covered in grease and drilling fluid was not for him. In 1992, Doug was recruited to serve as the lead technician on the upper Snake (USNK) River Basin NAWQA project and relocated to Boise. For the next 8 years, Doug spent his time coordinating and carrying out data collection activities across the USNK Basin. In 1999, after a few years of taking night classes, Doug graduated from Boise State University with a Bachelor of Applied Science degree and soon after was converted to a biologist. For the next 7 years, he spent his time working on numerous surface water related studies throughout Idaho. In 2007, an offer to move into a management position lead to Doug becoming chief of the Boise field office, where for the past 14 years he has overseen data collection activities throughout southwest Idaho. Over the years, Doug participated in several surface water reviews, served as an instructor at the National Training Center, and had the privilege of working on an international project making a trip to Iraq in 2010. Over his career Doug was the author or coauthor of 12 scientific publications. Doug has been recognized both locally and nationally on multiple occasions for his exceptional abilities in data collection and management. In retirement, Doug plans to spend his time traveling, camping, and fly fishing. After July 30, Doug can be reached at macabiflats@gmail.com . Doug was honored at a retirement potluck on September 17, at Eagle Rock (Quarry View Park) in Boise, ID. He will be missed. Congratulations to Doug on a very successful and productive career!

-Roy Bartholomay, Director, USGS Idaho Water Science Center, Boise, ID

On July 31, 2021, we rejoiced as a respected and beloved colleague, **Ken Skach**, moves forward from a very productive 31-year career with the USGS to a new journey with his family, travel, music, languages, and continuing self-improvement. Ken's career has spanned the same years as the NAWQA program, to which he gave his coding and computer support talents as well as field effort and scuba skills. Ken joined the USGS as an IT specialist in 1990 while completing his MA in mathematics at Portland State University. He supported computer users at the Oregon Water Science Center (OR WSC), but at first, he also was "free field labor" to help field crews. This exposed him to the guts of Water Mission Area (WMA) work. As such, he helped with water-quality synoptic sampling, indirect measurements of flood stream flows, and in 1990 and 1991 he collected invertebrate and fish tissue samples for the NAWQA pilot study in the Yakima River basin, foreshadowing his later 22 years of work for the NAWQA program. Ken also became a certified scuba diver and performed scientific diving for OR WSC sediment-oxygen demand projects from 1992 until 2007, including many trips in the Tualatin River basin and the Upper Klamath basin. Ken joined the NAWQA Data Synthesis team in 1999. His first tasks for NAWQA were to create the summary statistics graphs in the cycle one summary reports for the 1994-start-up NAWQA study units (and later for the 1997-start-up study units), and to aggregate and apply automated data checks to data from all the NAWQA study units. A few years later, Ken ported NAWQA's automated data checks from RDB scripts to Oracle's PL/SQL programming language, to run them in the NAWQA Data Warehouse. A decade later, he worked with other programmers to port these data checks into the NWIS Reporting Application (NWIS-RA), where they became available to all of WMA, no longer just to NAWQA. Ken is still a member of (and currently leads) the NAWQA Data Synthesis team. Ken's Data Synthesis connections prompted him in

2005 to teach a “Data” lecture at the USGS Sediment Data Collection Techniques course, held bi-annually near Mt. St. Helens in Castle Rock, WA. Exposure to WMA sediment work led to his programming the SedLOGIN application, which was released in 2010, providing one-time data entry of sediment samples into both NWIS and the Sediment Labs’ databases. Ken continued to teach the “Data” lecture through 2018, and to support other WMA sediment data needs including the development of the SedFF application, which was released in 2015, replacing its ill-fated predecessor, SedWE. As a member of the GW Users Group (GWUG) Ken was there when the “NWIS Vision” began to modernize its software. From 2011 through 2014 he was instrumental in the NWIS Vision’s design and creation of the National Aggregated NWIS Database (NATDB), and the deduplication algorithms that NATDB employs to untangle the messes when NWIS data were duplicated onto multiple databases. Since 2014, the NATDB has been a crucial tool for current NWIS Modernization efforts such as the Monitoring Location Registry (MLR), the migration of GW Levels data from GWSI to Aquarius Time-series, and the current project to migrate water-quality data to Aquarius Samples. In 2012, Ken joined the Water Quality Users Group (known as “phoenix”, later DDUSC, and now QWILS), supporting the water-quality community of WMA. On the extra-curricular front, Ken led the Oregon WSC’s “Survey Singers” from 1990 to 2005, brave colleagues who sang at USGS family Christmas parties. After a few songs, Santa would always show up, and the kids loved him. (Maybe they also liked the singing?) Ken also organized lunchtime poetry circles at the OR WSC office, off-and-on for the past 15 years. A consistent core group usually showed up, bringing poems to read to each other, while we ate lunch, a low-key, informal, and relaxing way to engage our left-brains. Ken is very grateful to have worked with so many talented, bright, and dedicated colleagues at the USGS for the last 31 years, and he simply cannot imagine how any other career could be better than the one he has enjoyed. He has co-authored 9 USGS reports and has appeared on the cover (scuba photos) of at least 2 other reports. (Not bad for an IT specialist!) In retirement he looks forward to spending more time with his husband, working more in the yard and on house projects, getting more exercise, frequenting the Oregon Coast, seeing more of his family, feeding his love of music, reading, and languages, and working on improving habits such as kindness, patience, forgiveness, simplicity, respect, and discipline. There’s plenty of room for improvement, and retirement is a good time to address these things! All of his colleagues will miss his bright, patient, thoughtful demeanor, and his big open heart. An inspirational career for an inspirational person. Thank you, Ken and enjoy the road ahead.

-James D. (Dar) Crammond, Director, Oregon Water Science Center

Ken offers this poem, as a parting reflection on his own changes of the past 31 years and his upcoming new era of retirement:

Change
Want the change. Be inspired by the flame
where everything shines as it disappears.
The artist, when sketching, loves nothing so much
as the curve of the body as it turns away.
What locks itself in sameness has congealed.
Is it safer to be gray and numb?
What turns hard becomes rigid
and is easily shattered.
Pour yourself out like a fountain.
Flow into the knowledge that what you are seeking
finishes often at the start, and, with ending, begins.
Every happiness is the child of a separation
it did not think it could survive. And Daphne, becoming a laurel,
dares *you* to become the wind.

Rainer Maria Rilke (1875 – 1926), from *Sonnets to Orpheus II*
Translated by Joanna Macy and Anita Barrows
From A Year with Rilke, Daily Readings from the Best of Rainer Maria Rilke, © 2009

With 31 years of service to the USGS under his belt, **Saeid Tadayon**, the AZ WSC “Master of Water Use Program” retired on July 31, 2021. I refer to him as the “Master of Water Use Program” because he was that to the Center – in significant part, his efforts built a robust and sustainable Water Use Program in the Center. The passion he brought to any cooperator meeting when he was talking about water use was, frankly, mesmerizing. Saeid joined the USGS in 1990 and

since 1995 took the role of Water-Use Specialist for the Arizona Water Science Center. He received his B.S. in Civil Engineering from Cleveland State University and his M.S. in Watershed Management from the University of Arizona. He is interested in a wide of range of water-use, water quality, and surface water hydrology. As Water-Use Specialist for Arizona, he oversaw the compilation of water-use data on an annual basis and the Arizona 5-year National Water–Use Compilation for the years 1995, 2000, 2005, 2010, and 2015. In Late 2000, Saeid joined the Water-Use Operations and Support Team (WUOST, formerly WUUG). As a Water-Use Specialist, he has developed a very strong program for the Arizona Water Science Center. From 1990 to 1997, he was project chief in several programs such as water quality, including an urban runoff study and a groundwater quality study in a military base in Tucson. Saeid also lead the field screening of water quality and bottom sediment associated with irrigation drainage in the Yuma Valley, AZ. For about a year and half in the mid-1990s, Saeid joined the National Water-Quality Assessment (NAWQA), Volatile Organic Chemical Synthesis team. From 2003 to the present, he has been the project chief for the retention and detention basins at Fort Huachuca, estimating infiltration from storm runoff. From the beginning of his career at the USGS, Saeid has performed many estimations of peak flood discharges and developed ratings for many stream gages in Arizona. He was involved in several team trips to Texas for estimating peak flood discharge. As part of a team in 2018, he was involved with developing ratings for some of the streamgages after 2017 Hurricane Maria in Puerto Rico. During his career, Saeid has enjoyed supervising his project teams and is proud of their many accomplishments. The passion he brought to any cooperator meeting when he was talking about water use was, frankly, mesmerizing. While Saeid will always be appreciated for Water Use, his career included much, much more. Congratulations Saeid – enjoy your newfound freedom!

-James Leenhouts, Center Director, USGS Arizona Water Science Center, Tucson, AZ

After more than 27-years with the USGS (and 11 years with the Burlington Northern and Canadian National Railway), **Tom Weaver** has decided to retire! July 30, 2021, was his last day with the USGS. As the Data Chief of the Upper Midwest WSC Eastern Data Section, Tom built a robust data-collection network that has seen considerable growth and diversification under his command. Tom's dedication to the USGS and his easy-going manner will be missed by all who have had the good fortune to work with Tom. He began his career at the USGS in 1992 after working for the Engineering Departments at Burlington Northern and Canadian National Railway, leaving as Supervisor of Work Equipment. He made a fortuitous decision to obtain a master's degree in geology at Michigan State University after realizing how difficult graduate-level mathematics were going to be, which led indirectly to USGS. Close friends of Tom know that his high school yearbook shows Department of Interior under his future plans! In 1972 when he penned those words, Tom clearly didn't know it would take 20 years to accomplish that goal. After studying igneous and metamorphic petrology and structural geology and completing his degree, Tom met Dave Westjohn, who was leading the geologic portion of the Michigan Basin RASA. Dave became Tom's mentor and together they churned out several RASA publications culminating with Tom's first, and only, professional paper. RASA work was slowing down and Tom took another job as a geologist at the Michigan Department of Environmental Quality in the Drinking Water Division. At MDEQ, Tom was mentored by Brant Fisher, who probably knows all there is to know about subsurface hydraulics and aquifer properties of the Michigan Basin. After attending Tom Winter's wonderful Groundwater-Surface Water Interaction class at NTC as a guest of USGS, the siren song of field work called to Tom and after a year and a half he returned to USGS, this time working for Steve Blumer and the Michigan Data Section. Given the choice of joining the two NAWQA Teams active in Michigan at that time, or learning streamgaging and running a field trip, Tom chose the latter. In 2000, Tom carted his family, (including two very small children) north to the Upper Peninsula and Escanaba Field Office where they made several life-long friendships. The family adapted as well as possible to living with ticks and winter lasting forever and Tom found a great running partner in the neighbor down the street. In 2006, Tom, his wife Dawn, son Martti, and daughter Maija returned to the Lansing area and assumed the role of Michigan Data Section hydrologist. During the period from 1997-2010 Tom co-authored a number of papers including several for Michigan tribes culminating in two very nice SIR's describing small watersheds in the Upper Peninsula written with Bill Cannon and Laurel Woodruff. In late 2010, Steve Blumer told Tom that he was retiring from his role as Data Chief, and he encouraged Tom to apply for

the position. After a rigorous interview that Tom describes as his "very worst," he was given the job. During 2010-11, all three of Michigan's veteran Field Office Chiefs retired and the Michigan Data Section was literally deposited in Tom's lap. Since 2011, Tom has played a very active role in the bi-national Lake Superior Partnership Working Group and the Great Lakes Coordinating Committee. Tom credits staff from the Office of Surface Water, especially the Regional Surface-Water and Groundwater Specialists, Kevin Oberg, Mike Rehmel, and others at the HAWG, the Michigan Field Office Chiefs (Rick Hubbell, Todd Dewitt, Matt Chilson, and Neal Craig before Matt), his fellow Data Chiefs in the UMid and MIOH WSCs and across the country, his supervisors (Steve Blumer and Ralph Haefner), and the fantastic hydrologic technicians and hydrologists he's worked with from many places, but especially Michigan, for making these last 28 years awesome. This is certainly the best career that anybody could want! To borrow a phrase from Hydrologic Technician Wally Larson, "*I can't believe we get paid to do this!*" After retirement, Tom is pondering bicycling, traveling the world with Dawn and their grown kids, model railroading, and perhaps a scaled back role at USGS, helping his successor get planted, and maybe doing a bit of Great Lakes boating and gage construction, and another round or two of cableway inspections! Feel free to reach out to Tom at cprtom@comcast.net. We wish him well in his future endeavors!

-John F. Walker, Director, Upper Midwest, Water Science Center

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News Notes on Sustainable Water Resources – Submitted by Tim Smith (March 2021)
Lake Memphremagog

https://en.wikipedia.org/wiki/Lake_Memphremagog

Lake Memphremagog (French: *Lac Memphrémagog*) is a fresh water glacial lake located between Newport, Vermont, United States and Magog, Quebec, Canada. The lake spans both Quebec and Vermont, but is mostly in Quebec. Most of the watershed that feeds the lake is located in Vermont, and is a source for accumulated phosphorus, sediments and other pollutants. Cleanup efforts since the late 1980s have improved the water quality. The lake furnishes potable (drinking) water for 200,000 people.

The lake is 31 miles (50 km) long with 73 percent of the lake's surface area in Quebec, where it drains into the Magog River. However, three-quarters of its watershed, 489 square miles (1,270 km^2), is in Vermont. The total is 687 square miles (1,780 km^2), with 198 square miles (510 km^2) located in Quebec.[3] In Vermont, the lake lies in parts of the towns of Derby and Newport, in addition to the City of Newport, all in Orleans County. In Quebec, the lake lies in parts of Austin, Magog, Ogden, Potton, Saint-Benoît-du-Lac, and Stanstead Township, all in Memphrémagog Regional County Municipality. The lake occupies most of what the Vermont Agency of Natural Resources calls "Basin 17". At the very south end of the lake, there is the South Bay, connected by the narrowest part of the lake.

The lake elevation is approximately 682 feet (208 m) above mean sea level. Both ends of the lake are fairly shallow, with depth ranges of 20 feet (6.1 m) to 30 feet (9.1 m). The lake bottom takes a dramatic drop in Canada, starting opposite Mont Owl's Head and continuing that way north to Gibraltar Point, where it starts to climb back to the shallows of the north end. Its maximum recorded depth of 351 feet (107 m) is located in Canada, opposite Jewett Point (at approximately 45.111621°N 72.278491°W). The lake is the third deepest in Vermont. It contains 21 islands. Province Island, the largest, is divided by the international border. The lake is irregular in shape, and along its shores are several striking indentations, in some places low, and in some other parts high and rocky. Along the western shore of the lake are several mountains, prominent among which are Owl's Head, Elephantis, and the Hog's Back.

NEWS OF RETIREES

Ernest S. Denison writes: As I look through the May 2021 issue of the Newsletter, I don't recognize the names of any of the new retirees, only one of the News of Retirees (Clayton Kauffman), but two of the memorials (Melba Carter and Klyda Steele). Could it be that I am getting older and could well be with those who passed away. I began working for the USGS in 1951 (Surface Water Branch) and retired in 1984, having worked in Utah, Alaska, Nebraska, Texas, New England, and Wyoming Districts. My wife of 64 years (Ola Belle) passed away in 2011. My daughter, Rozanne and her husband Rick Clayson, invited me to move in and live with them in 2020. Last month Rick and Rozanne celebrated their Golden Wedding Anniversary. We decided to make it an Ernest and Ola Denison Family Reunion celebration also. All of her children and their families, and all of my living children came for the celebration, 70 in all. The festivities were held at Goodfellow AFB Recreation Camp here on Lake Nasworthy, VA.

Ray Hoffman writes: G'day Mates, Elizabeth and I have recently moved to Keppel Sands, Queensland ("The Sunshine State"). Thus far, this is our fourth relocation in Australia since my retirement from the WRD NV District in 2000. We have now resided in 5 of the 6 official States in this country. Keppel Sands is a small (pop. 400) coastal community situated on the Tropic of Capricorn roughly 300 air miles north of Brisbane. The town has a pub, a post office/grocery combo, and a tiny bistro. Activities here center on recreational fishing and crabbing. A milestone for us: we both have just reached the octogenarian classification and in relative good health to boot. No C-14 jabs yet; they're a bit slow down here. We hope to revisit USA in the summer of 2022. But with the C-14 Delta variant assault on everyone maybe "see ya", maybe not.

Richard Kane writes: I recently found this newsletter on-line, it's really great to hear from other retirees. I retired from the Caribbean-Florida Water Science Center in January 2020. I started volunteering for the Tampa Bay History Center soon after. I've always enjoyed studying history as a hobby. I now give tours of the museum in Tampa and a historic manor home, Chinsegut Hill (near Brooksville, FL), 2-3 days a week and give history presentations occasionally. In December 2020 I did a tour through central and northeast Florida of sites related to the Seminole Indian War and the Civil War. Later in April 2021 I toured Civil War battlefields in Alabama, Mississippi, Tennessee, and Georgia. I am planning further trips in the near future to Virginia and Pennsylvania. I am also enjoying hiking many different trails in Florida. I have to admit that sitting out floods and hurricanes has not been easy but also I can now enjoy listening to the rain and not worrying about who's getting flooded and what gages aren'ttransmitting.

Stan Leake - update (who is on the Local Arrangements Committee for the Tucson Reunion 2022) says about his kidney transplant of September 25, "My recovery has been slow. I'm fatigued and some pain persists. The good thing is that the kidney seems to be working. I expect it to be in top form in the coming month or so."

Sharon Mathey writes: I'm still living in Lansdowne Woods, on the 5th floor overlooking the Potomac River and love the area. Hoping COVID clears up soon so I can do a bit of travel with my daughter. Unless it's cancelled, will visit Ocean City Sunfest in October. This catches me up with my dues. Hello to all!

Cheryl Music writes: Michael and I are both staying healthy and doing great. We keep busy and try to spend as much time as we can at our camp in the Adirondacks. Our travel is pretty much via car. We now have 6 grandkids - 4 boys (two age 6 one age 4 and one 13) and 1 granddaughter 4-years old. For the last 6 years plus we've been watching two of our grandsons every day as both their parents are both teachers. I still do stained glass whenever I can and looks like most of the craft fairs are to going to happen this year.

Daisie Oden writes: I would appreciate it if I could have a paper copy of the WRD Retirees Directory. Thank you so much for all you do to get the news out about our friends. Blessings

Betty Palcsak writes: Thank you for all you do for the USGS Retirees!

Rose Pinnix writes: Just a hello and thank you all for keeping up the USGS Retirees' info and updates.

Curtis Price writes: I'm starting my sixth-year teaching at the South Dakota School of Mines & Technology in Rapid City, SD, where I'm a Lecturer, teaching GIS classes, remote sensing, and Intro to Survey. I've passed my written and oral exams in April, so I'm now a PhD candidate, ABD, developing methods and comparative analysis of stream profiles and watershed geomorphometry from DEMs and NHDPlus. I'm also the chief bottle washer at SDSMT's ArcGIS Online site and manage South Dakota's statewide education ELA with Esri. Now that I'm vaxed, I can go back playing clarinet with the SDSMT Univ band, Rapid City's Municipal Band, and on occasion with the Black Hills Symphony Orchestra. I send a warm shoutout to the family of former GIS colleagues inside and outside the Bureau!

Ron Rathbun writes: Enclosed is check for my dues with a donation to the Scholarship Fund. I certainly appreciate all you are doing for the Retirees and monitoring those scholarship funds helping young people with their hydrologic educations. Thanks, and Regards

Ron Rickman writes: Enclosed are my dues. Nicole and I are enjoying Alaska and keeping busy with climbing, hiking, biking, and skiing. Nicole also keeps busy with gardening and water-color painting. I am still volunteering some of my

time with USGS Pacific Island Water Science Center which I enjoy. The staff of the PIWSC continues to produce outstanding, timely, data and investigation products in spite of the numerous travel and work restrictions due to COVID19.

John Singer writes: All is well at Smith Mountain Lake in Virginia. I have a check in the mail to get my membership up to date. Life is still good and Micki and I are still very active with the local rescue squad. Covid has messed up the hospital system around here and we are continually getting diverted from facilities due to no beds available. We hope to make it to Tucson this coming Spring but sort of holding our breath on where this Covid thing is going to go; one step forward and two steps back??? End of this month will be 26 years of retirement here at the lake, where does time go. Everybody stay healthy as I don't want to have to come pick you up in my ambulance.

Stephen Sorenson writes: Jo Anne and I are gearing up to get back to traveling which has become our passion since retirement. Staying home and avoiding human contact has been no fun and the uncertainty of planning future trips has been a nightmare. Last year I was able to spend time in my hangar restoring the plane I built and first flew in 1981. It was so great to see the old bird flying like new again. I also got in a Dory trip down the Grand Canyon, and a rafting/fishing trip in Alaska this year and we were able to get to the Oshkosh EAA fly-in in July. If all goes well, we will be in Europe most of October on two cruises. What could possibly go wrong but it's time to start moving again. Our daughter and her family have settled in Lancaster, PA which is a reasonable drive from Reston and our 7- and 4-year old grandchildren are truly remarkable. We will be in Tucson for the Reunion in March and hope to see a bunch of my USGS friends. Sign up. It will be fun.

Darla Straka writes: ***(note to Kate Flynn***) I don't mind getting the newsletters electronically, but I would like to receive the Directory in hard copy, if there are any extras still around. Our printers are old and unreliable. Let me know if that is possible. I worked for USGS, Water Resources Division, Albuquerque, NM, for 18 years. I retired in 2003, we were known as a WRD office while I worked there. Thanks

Pat Tucci and Zelda Bailey write: It's been an exciting few months for us this summer. We just celebrated the birth of our grandson, Ruxton, in September. Our rock and mineral business, GEOdyssey, had its final mineral show in September as well. We did a bit of travelling over the summer. Colorado in June, Oregon (to help get the baby's room ready) in July, California in August, and New York for a family reunion in September. Of course, a visit with the new grandson in late September/early October. Pat continues to play at open mic nights and with his duo acoustic group, and Zelda has gotten more into her abstract painting. It's been a somewhat sad year, with the passing of too many friends and relatives. Zelda and I remain healthy, with just the usual age-related aches and pains. We're looking forward to seeing old friends at the reunion in March.

Kelly Warner (Illinois Affiliate Member) writes: Thank you for your kind words, cards, flowers, and to those that made it to my daughter's funeral. During the darkest days of my life (news article: Champaign woman dies after being hit by a vehicle last week | Courts-police-fire | news-gazette.com). I felt the love and kindness of my USGS family. I can't begin to tell you how much that meant to me. My daughter, Lizzy, was passionate about science, climate, social justice, and helping people. Lizzy was working on her PhD in engineering at Northeastern University and I was so proud of her. All those years of family vacations where we stopped at geologic road cuts or got out of the car to look at stream erosion when driving over a river, paid off in her decision to follow in a field of science. I'll never stop feeling proud of all she accomplished. In her 29 years, Lizzy shattered glass ceilings and served as a role model to me and so many others. One of Lizzy's legacies will be a scholarship for Women in STEM that we are working to endow at Knox College. She and I were both passionate about getting more women in science.
https://knoxstarter.knox.edu/s/289/bp20/project.aspx?sid=289&gid=1&pgid=3212&fbclid=IwAR3w7jez_Pnv0AeEqJ8z2DD4GuwZkBICZM7rZMRdqUABaFxt7E0z6qfn9nk

DUES: The following 82 members paid $3,465 in dues from May to September 2021.

Gary Anderson
Stephen Anthony
Allan Arntson
M.S. 'Doug' Bedinger
Rick Benson
Merritt Blalock (Lanza)
Nancy Bley
Judith Boohar
R. John Burt
Linda/Bill Carswell
John M. Clemens
John Coffin
Robert Coffin
John Colman
Judith Cornwell
Russell E. Curtis
L.J. Dantin
Ernest Denison
Gerald Feese
Randall Fields
Devin Galloway
Eugene Gann
John Garbarino
Ronald Garrett
Linda Geiger
Keith J. Halford
Frederick Heimes
Glen Hess
Shirley Hildalgo
R.J. Hoffman
Rick Iwatskubo
Marshall Jennings
Ronald Kuzniar
Vincent Lai
Chuck Lamb
Matt Larson
BJ Lecrone
Gary Levings
Jerry Lindholm
John R. 'Jack' Little
Russell Livingston
Katherine Long
Gail Mallard
Sharon Mathey
Roger McFarlane
Michael Merritt
Terri Moore
David Morganwalp
Cheryl Music
Kay Naugle
John L. Oberg
Kevin Oberg
Daisie Oden
Betty Palcsak
Bruce Parks
Kathy Peter
Rose Pinnix
Lawrence Prakken
Ronald 'Ron' Rathbun
Walt Rennick
Ronald Rickman
Kernell Ries
Kimberly Rogers
John Rote
Stewart A. Rounds
Raymond Schaffranek
Nancy Schild
Gerald Schultz
Randy See
John Singer
Gail Sladek
Stephen Sorenson
Timothy Stamey
Dave Stanard
Wilbert Thomas
Daphne Wahl
Janet Welday
Nelson Williams
Mike Yurewicz
Chet Zenone
Marc J. Zimmerman
John Zogorski

MEETINGS AND GATHERINGS

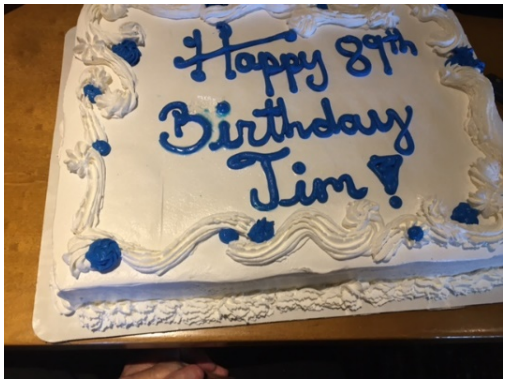
Indiana Retirees Gathering
Summer 2021

From left to right: Bob Autio, Lee Watson, Marty Risch, Dave Cohen, Lorraine Larsen-Hallock, Charlie Crawford, Kathy Fowler, Jeff Martin, Debbie Majors, Jay Kiesler, Sonja Sanders, Amada Egler, Keith Bobay, Pat Long
The Indiana chapter of the USGS Retiree sent their State Representative on his merry way to Wenatchee, WA on July 7. Jeff served the Indiana chapter well and went above and beyond by hosting socially distanced retiree gatherings on his driveway during the Covid pandemic. The Indiana Retirees will miss his leadership, but mostly his friendship.

Central Region Retirees' Fall Luncheon (Denver)
Olive Garden
October 6, 2021

Front Row (L to R): Barbara Kemp, Jim Blakey, Merilee Bennett
Second Row (L to R): Dave Lystrom, Karen Lystrom, Carol DeHerrera, Barbara Ruddy, Paula Blakey, Judy Weeks
Third Row (L to R): Leo House, Jim Bennett, Teresa Krizman, Betty Palcsak, Jack Weeks, John McLean

As well on this date we celebrated Jim Blakey's actual 89th Birthday. For those who would like to wish Jim a belated birthday wish or just say 'Hi' – the easiest way to contact him currently is through his email jblakey@comcast.net or by text message at 303.877.6381



Reston Retirees Activities

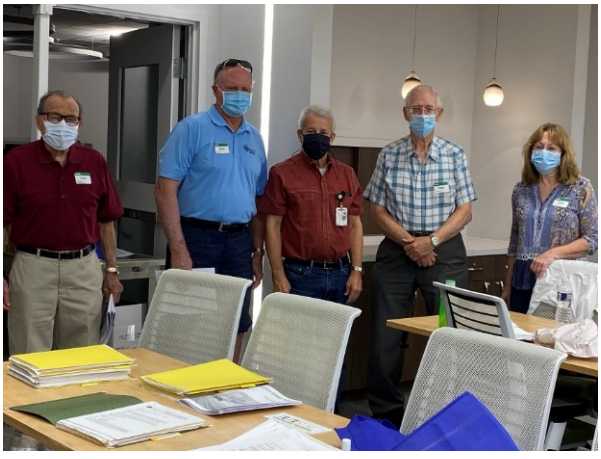
Reston Retirees have been meeting regularly over the summer. Members have missed the presentations we usually had at our lunches. In September we experimented with a no-electronics presentation. John Keith presented *Adventures in Borneo: Nature on Steroids*. It went well and we look forward to a talk from Ward Sanford in October on *Using NASA'S GRACE Satellite Date to Help Constrain Evapotranspiration Across the Conterminous United States*.

For the first time since March 2020, we got back into USGS Headquarters to stuff envelopes (we have been doing this outside on the patio.) It was nice to be in out of the heat. If numbers start going back up, suspect we won't be in for the November stuffing.

July 11, 2021: The Reston Retirees met at Temporary Road Park for lunch and conversation.

Sitting, left to right: John Keith, MaryJo Baedecker, Ken Lanfear, Lee DeCola, and Sandy Clark. **Standing, left to right:** Kate Flynn, Bill Roddy, Leslie Roddy, Linda Debrewer (not retired), Sue Marcus, Katherine Lins, Debbie McLean, and David Bausman. **Behind the Camera:** Cathy Hill.

August 2, 2021: August Newsletters' Envelope Stuffing



Left to Right: Al Condes, Tom Yorke, Lenny Konikow, Andy Anderson, and Debbie McLean **Behind the camera:** Kate Flynn

August 2, 2021: Lunch

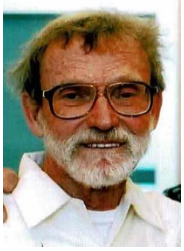
Sitting, left to right: Andy Anderson, John Keith (GD), Sandy Clark (GD), Lee DeCola. Standing left to right: Mary JoBaedecker, Tom Yorke, Ken Lanfear, Pat Leahy, Peter Lyttle (GD), Kate Flynn, and Dick Engberg. **Behind the camera:** David Bausman

September 13, 2021: Lunch

Sitting left to right: Leslie Roddy, Bill Roddy, Lenny Konikow, and John Keith (GD). **Standing left to right:** Peter Lyttle (GD), Lee De Cola, John Repetski, Dick Engberg, Pat Leahy, and Ken Lanfear. **Behind the Camera:** Kate Flynn

Washington Retirees' Summer Picnic
Hosted by: Gil and Marlene Bortleson

Attendees (L to R): Sandy & Ralph Embrey, Gary Turney, Sue Webb, Marc Savoca, Sheila Loyd, Brian & Kathleen Drost, Norm Dion, and Gil Bortleson (photo taken by Marlene Bortleson).



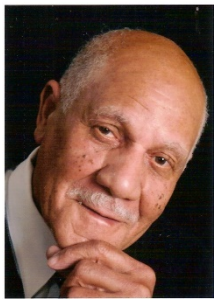
Sidney H. Alwin passed away on July 1, 2021, in Tucson, AZ after a brief battle with cancer. Sid was a special person who lived life his own way. A self-proclaimed "Do-it-yourselfer," he always had a positive attitude and caring spirit. Sid loved the desert and considered all that grew and lived within it sacred. Sidney grew up in Mound, MN and graduated with a degree in graphic design from the University of Minnesota. In his thirties he met and married his wife JoAnn and shortly relocated to Tucson, AZ. An avid photographer, he took thousands of photos of the desert, of the world, and the people in it as a record of what was spectacular about life. He was a retired graphic designer and cartographer at the U.S. Geological Survey, Water Resources in Tucson. He would return long after retiring to his place of work to care for the many plants that he maintained for years. He loved opera music and was an avid supporter of public media. He loved donning a Santa hat and delivering gifts to his friends and neighbors at Christmas time. His most important task was watering his beloved plants and feeding the fauna that visited his environs in Tucson. He was a thoughtful and generous soul. We will miss him greatly. Sidney is preceded in death by his father Roy Alwin, his mother Norma, his wife JoAnn, and his brother. He is survived by his son, a stepdaughter, his niece, a nephew, neighbors, and co-workers.

A memorial service was held for retired hydrologic technician **William Paul Bennett** of Lilburn, GA, June 2021. Paul passed away on January 2, 2021, at his home after a long battle with cancer. He was born on October 3, 1947, and grew up in Crenshaw, MS. In high school Paul participated in track and received both the science and mathematics awards. He graduated in 1965 from North Panola High School as an honor graduate. Paul attended Mississippi State University and received a Bachelor of Science degree in Geology. Following graduation, Paul spent an additional year in graduate school. After leaving college, Paul served 18 months in the U. S Army, mostly in Turkey, as a microwave radio technician. After serving in the Army Paul moved to New Orleans, LA, and began working as an exploration geophysicist for Texaco. New Orleans became Paul's adopted hometown, and he became a lifelong Saints fan. During his years working as a geophysicist, Paul had the opportunity to work for Aramco, the Saudi Arabian Oil Company. He lived in England for 3 years and enjoyed traveling all over Europe. In 1993, Paul began working for the USGS as a Hydrologic Technician. His first assignment was in the Wichita Falls, TX, field office. In 1999 he transferred to the Georgia Water Science Center in Atlanta, GA. Paul told his family that he always considered the years he spent at the USGS the best job he ever had. He got to spend many days outdoors in the beautiful North Georgia Mountains and he developed very close relationships with the people with whom he worked. Paul retired in 2010. After his retirement, Paul enjoyed making fretwork cutouts with his scroll saw, watching sporting events on television, and traveling to see his grandchildren in Texas and later California. ***Chris Smith, Paul's supervisor in the Georgia Water Science Center writes***: "I worked with Paul for almost ten years. He was kind, thoughtful, well read, respectful, hardworking, and a great teacher. He had the type of demeanor that was quiet yet commanding. Everyone listened when he spoke because they respected his opinion and perspective. This respect was earned through his persistent work ethic, patience, and ability to communicate complicated theories. He was our "go-to" instructor for data analysis and is responsible for the fundamental knowledge of numerous Technicians in the Georgia offices. The following story about Paul's work ethic is a legend in Georgia. Paul participated in many gage construction efforts. During one of these efforts something happened that caused a big hole in one of his boots. In all honesty, we all thought the boot was not repairable. Most people would have used this as an excuse to take a break from the work, but Paul just grabbed a roll of duct tape, taped up his boot and kept going. He didn't miss a beat. As a matter of fact, he did such a good job of taping the boot that he continued to wear it for several more weeks. In our office we often have intense discussions about the best BBQ restaurant in Georgia. During one of our discussions, I declared my loyalty to a particular establishment. This BBQ restaurant was situated in the middle of Paul's field trip. From that day on, whenever Paul passed that BBQ restaurant on his trip, he would stop and purchase a BBQ sandwich and bring it to me. I never asked him to do it, he just did it because he knew I enjoyed the BBQ." ***Brian McCallum, Paul's section chief in the Georgia Water Science Center writes***: "It was an honor to speak on behalf of Paul's USGS colleagues at his memorial service. It was a very touching and emotional service as he was a good friend to all and a dedicated public servant. His collection of hats, along with a USGS hat, was displayed

along with a number of Paul's other keepsakes at the front of the church. It was so humbling to hear from his wife Susan just what working at USGS meant to Paul. He was one of a generation of hydrologic technicians that truly understood the idea of mission above self. After the service, several his extended family and friends came up to me to talk about Paul and his time with us at the Norcross office. They all told me afterwards that hearing the work that he did for USGS was so interesting to them and they gained further admiration for Paul from it. I personally will miss Paul's friendship, quiet demeanor, and dedication to a job well done. I have this vision of Paul wading a beautiful stream in the mountains somewhere as he so loved to do."

Michael H, Frimpter, 86, passed away on April 17, 2021. Diagnosed with a rapidly progressing pancreatic cancer on Friday April 9th, he asked for no extraordinary measures and was moved to Avow Hospice where he spent time with his wife Ali and two daughters in the week before he died. Michael was born on December 10, 1934 and was the youngest of two sons born to Kathryn "Kay" McCabe Frimpter and George Anton Frimpter of Haverstraw, NY. His father George worked in banking and real estate in New York City. Kay was an artist and a teacher. Mike attended Haverstraw High School and enjoyed a moment of fame when he helped the team win a football game. He went on to Williams College and then to Boston University where he earned a PhD in Geology. Between undergraduate and graduate school, he served in the army and was stationed in South Korea after the truce. At Boston University, he met geology student Bonnie Jean Hubler, when he was the teaching assistant in her minerology lab. They married in 1962. The couple raised their three children Carolyn Jean (1964), Timothy Clark (1966-1983) and Kathryn Reta (1968), in Bedford, MA, a beautiful area, rich in history. They were active members of the Trinitarian Congregational Church in Concord in Massachusetts. In 1983, Timothy died tragically at age 18 to the shock and deep sadness of the whole family. It took a while for Mike and the whole family to recover from this loss. Mike had a quiet sense of humor which delighted those around him. He put googly eyes on the family telephone so that the receiver looked like a face and left it there for family members to find. His children would put small broken items on his dresser, and they would be returned to their dressers, repaired without comment. After a divorce, Mike met Alice (Ali) Ulrich, a musician and teacher. The couple married in 1987 and Mike became the beloved stepfather to Scott, Kristen, and J Lapham. Mike was a hydrogeologist who dedicated his life work to public service. He worked for the Water Resources Division of the USGS from 1963-66 in New York. He taught geology at the University of Wisconsin from 66-71, and then in 1971 he joined the USGS Boston office, where he served as Chief until his retirement from government service in 1991. Throughout his career, he worked diligently to safeguard public drinking water and the environment. His daughter remembers him sitting at the kitchen table on a weekend, carefully handwriting a response to someone who had contacted the Geological Survey with basic questions about groundwater. Mike was serious about his work but could be lighthearted as well. He enjoyed science fiction and was known to slip Star Trek aliens into professional slide shows, saying "Whoops, wrong planet!" After retiring from the USGS, he moved to Cape Cod and worked for Horsley and Witten, an environmental science consulting firm that assisted the U.S. Environmental Protection Agency and Native American Tribes and others manage their water resources. Mike developed a water resources protection plan for the island of Molokai (Hawaii). Colleagues remember him as "Mr. Water Resources" in Massachusetts. With a colleague he invented a method of estimating ground water levels now known as "The Frimpter Method" which is still taught and used today. Mike mentored young geologists who remember him fondly. He shared his knowledge with children and grandchildren who never tired of bringing rocks to him for identification. He had many rock specimens, including some that would fluoresce spectacularly under ultraviolet light. Mike and Ali moved to Cape Cod and to Naples Florida to enjoy their retirement. Mike was a quiet man and he benefited from his wife Ali's outgoing nature and sense of fun. In retirement, Mike took up painting in earnest and developed a precise, bold style. His work was exhibited, and some pieces were sold. He also kept carnivorous plants and orchids and would often send photos of their blooms to his children and friends. They were active in the Vanderbilt Presbyterian Church where Ali sang in the choir and played the trumpet and Mike ran the sound systems for many years. Mike is predeceased by his beloved son Timothy Frimpter, and a brother. He leaves his wife Ali, his two daughters and their spouses, he also leaves his three stepchildren. Mike had seven grandchildren. Mike was well loved. He made a difference in the world. He was a gentle soul who let people be who they are, and he will be greatly missed.

Our hearts are heavy today. Hydrologic technician **Samuel L. Helmuth, 27**, was killed in a traffic accident while on vacation in Alaska. Sam led our Idaho National Laboratories in the water quality sampling program and was lead author of a geologic map of the Butte City 7.5' Quadrangle: https://idahogeology.org/product/t-20-04. Sam lived in of Idaho Falls, ID, and was formerly of Tony and Richland Center, WI passed away on July 17, 2021, near Soldotna, Alaska, due to injuries sustained in an automobile accident while on vacation with friends. Sam was born on the cold, early morning of Jan. 15, 1994, at Meriter Hospital in Madison, WI, to parents, Kevin Helmuth and Sara Jahr Helmuth, and an extended family who most eagerly awaited his arrival. Sam had a love for everything outdoors and all that swam, crept, or crawled, with his most favorite being frogs, his collection of toy dinosaurs, and tacos. Sam enjoyed visits with Great Grandma Helmuth, wheelbarrow rides with Uncle Wilbur and tractor rides with Uncle Harold at the farm. Sam was always at the door ready to go swimming at Aunt Gloria's and play with his cousins. He was most excited for the arrival of his little brother, Jacob, in the spring of 1998. Finally, he had someone to share his adventures with. Sam's adventures continued in Richland Center with many new friends and exploits. He loved working as a lifeguard at the pool and his special friend, Alex Toney. He loved sports and played football, basketball, and track in middle and high school. After high school, Sam continued his education at the University of Wisconsin-Eau Claire, where he made more new friends and had even wilder adventures. Great times were had at the dorms, the house on Water Street, and working at the Housing Authority. He graduated in the winter of 2016 with a Bachelor of Science degree in geology. After graduation, Sam accepted a position with the USGS, working at Idaho National Laboratories in the water quality sampling program. It was hard to have Sam so far away from home, but he absolutely loved his work and all those he worked with at INL and the USGS. Sam was most at home exploring the mountains of Idaho, Utah, Wyoming, and everything west, especially the Tetons. New passions were tying flies, chasing cutthroats, skiing Book the Bay, and piloting the Shaggn' Wagon at the Drummond Bar Stool races. Of course, there was his love of the Bucks and everything Milwaukee. One of his dreams was to move close enough to Milwaukee to get season tickets and attend every game. Sam was an amazing self-taught artist and musician. He could play nearly anything set before him, except the accordion. He did not share in his father's affinity for polka. His favorite instrument was the guitar. There are many great memories of when he would be home, playing late into the night at Jake's house. He wrote many songs which we will cherish forever. Sam is survived by his parents, little brother, grandparents, aunts and uncles, and many special cousins. Sam was preceded in death by maternal grandparents, and his beloved dog. Funeral services were held on July 31, 2021, at the Pratt Memorial Chapel, with burial to follow in the Richland Center Cemetery.



Milford S. Johnson, 89, transitioned to eternal life in the comfort and love of his home on April 19, 2020, surrounded by his loving family. Milford was born on Sunday, May 4, 1930, in Harrisburg, PA, the eldest son to the late Milford Johnson and Geneva Troy. Milford was a 1948 graduate of the former William Penn High School. Upon graduation, he served in the U. S. Navy, serving on the USS Franklin D. Roosevelt, USS Missouri, and USS Walter B. Cobb. He dedicated 10 years of service at the former Olmstead Air Force Base, 40 years with the U. S. Department of Interior and 25 years of part-time service with Skelly and Loy. In his leisure, Milford enjoyed participating in athletic activities such as jogging, bike riding, golfing, swimming, and aerobics. He was regimented in his physical fitness at the YMCA, former Bentley Club, and Central Penn Fitness & Aquatics. He enjoyed swimming and his accomplishments in the Pennsylvania Senior Games and Masters Swimming Competitions. He was an avid reader, conversationalist and welcomed sharing his opinion on social and political topics. He served on the Dauphin County Friends of Wildwood advisory board and served 20 years on the counties Meals on Wheels program. As a member of the American Legion Post 1001, he occasionally enjoyed sparing conversations with his nephews and friends. His candor often began with letting you know what “the bottom line” is of his view. Along with his parents, Milford is predeceased by his eldest daughter and his sister, his former spouse, Gladys Moody. Milford leaves behind to celebrate his wonderful life, his sister, his two brothers, his daughter and son-in-law of Sacramento, CA, stepdaughter of Baltimore, MD, two sons and their wives of Fresno, CA and of Harrisburg, PA. His four grandchildren and a host of family and friends. Milford was a member of St. Andrews in the Valley Episcopal church. He served as Junior Warden and maintenance worker at the city

church, he was active in the choir and various activities sponsored by the church. Services were private, and his burial was held on April 27, 2020 at the Blue Ridge Memorial Gardens, Harrisburg, PA.

It is with a heavy heart that I tell you all that our dear friend and OBPI colleague, **Becky B. Mabe,** passed away very suddenly over the weekend, early on Saturday morning. All who knew Becky knew that she was kind, thoughtful, quiet, had a great sense of humor, and a love of animals, including her horses and cats. Becky was a true professional in all she did, as all who worked with her can attest. Becky spent her entire Federal career working with the USGS, beginning in 1990 as a Secretary in the (then) Geologic Division, Office of Mineral Resources. She moved to the Water Resources Division in 1992, where she worked as an Administrative Operations Assistant until 1998, when she accepted a position again with the Geologic Division, this time as a Budget Analyst. In 2000, she came to the Office of Budget, Planning, and Integration (then known as the Office of Budget and Organizational Analysis) as a Budget Analyst. For the last 21 years, Becky worked in OBPI, most recently as our OIG/GAO Audit Liaison, handling numerous requests for the bureau and interfacing with DOI-PFM, among other duties. Becky was dependable and always willing to go the extra mile, including becoming a SharePoint whiz this year while working with her colleagues on the back-end programming for the FAIR Act inventory. Throughout her Federal career, Becky was committed to furthering the mission of the USGS, and she made a positive and lasting impact on her colleagues and friends, both professionally and personally. She will be dearly missed by her colleagues and friends.

I regret to inform you that Senior Research Scientist **Ronald S. Oremland** died of leukemia on September 16th, 2021. Ron joined the USGS in 1977 following a post-doc at NASA-AMES. He conducted groundbreaking research with the National Research Program for 42 years, exploring the biogeochemical cycling of methane, acetylene and methyl halides, as well as arsenic, selenium, antimony and tellurium. Among his many accomplishments, Ron was a Fellow of the American Association for the Advancement of Science, the American Academy of Microbiology, the American Geophysical Union, and a recipient of the DOI Distinguished Service Award. Since his retirement in 2019, Ron remained active as an emeritus scientist with USGS. More on Ron's many scientific accomplishments and the honors he received can be found at usgs.gov/staff-profiles/ronald-oremland?qt-staff_profile_science_products=0#qt-staff_profile_science_products . On behalf of the entire USGS family we offer our condolences to Ron's family and his many USGS colleagues on his passing.

-Gary L. Rowe Jr., PhD. Chief Operations Officer (Acting), USGS Water Mission Area, Denver, CO

Charles N. Owens, 83, passed away on July 10, 2021. He was born on November 9, 1937, to the late John and Georgia Owens. Charles was a graduate of Ashland, Kentucky Public Schools. He earned a Pre-engineering Associate Degree from Ashland, Kentucky Junior College. Charles served in the United States Marine Corps and was honorably discharged July 1963. During his life, Charles was blessed to obtain employment in many areas. He retired in May 1994, from the USGS, Water Resources Division. He leaves to mourn his wife of 32 years, Wanda Owens; a daughter; a sister and a brother; and grandchildren; great grandchildren; nieces; nephews; cousins. At the time of Charles' death, he was a member, in good standing, at Kimberly Parkway Church of God. In previous years of his life, Charles was a faithful deacon and choir member at Bethany Baptist Church and a faithful deacon at Columbus Christian Center, both churches located in Columbus, OH.

David C. Prowell, 72, passed away on July 16, 2021 at his home. He battled Lewy-Body dementia and peacefully passed surrounded by family. He was born in Newnan, GA on May 8, 1949, and spent his childhood in Moreland, GA and Fairburn, GA. After graduating from Campbell high school in 1967, he attended Emory University. He earned his BS and masters in geology. While in high school, he met Glenda and they married while in college. They moved to UC Santa Cruz where he earned his PhD in Geology, writing his thesis about the San Andreas Fault. In 1974, he took a position with the Geologic Division, Branch of Eastern Regional Geology, USGS, in Reston, VA. In 1981 he moved back to Atlanta and continued to work for the Geologic Division but co-located with the Water

Resources Division, Georgia District office. Dave's focus was the study of the Atlantic Coastal Plane faulting and neotectonics. Although he originally worked on the Bel Air fault in GA, he soon turned his attention to other interests. Dave became an expert on Atlantic Coastal Plain lithology and stratigraphy, studying sediments of both Cretaceous and Tertiary age, and even dabbled in micropaleontology by learning the basics of palynology. He was instrumental in establishing the East Coast Drilling program, which was responsible for providing 100+ cores for research on broad topics such as hard rock geology, impact craters, micropaleontology, and climate. Dave retired from the USGS in 2005 but continued working in NC and SC as a Scientist Emeritus until 2014. ***Elliott Jones, one of Dave's younger colleagues writes***: "Dave was a true friend. I was privileged to be in the same lunch circle with him for a number of years at the Georgia WSC. I was the lucky recipient of ample portions of the storytelling for which Dave was famous. Who doesn't remember the witty and irreverent poems he used to pen about our office mates and deliver at Holiday Parties? I'm a co-author with Dave and Morris Maslia on a 2002 report on the hydrogeology and water quality at the deep test well on Colonels Island near Brunswick. Morris had assembled much of the water-quality data and Dave provided excellent descriptions of the stratigraphy from cuttings and geophysical logs. I ended up assembling all the data and analyses into a summary report. It was an honor to be an author on a report that bears our three names. Dave was like a big brother or favorite uncle in my USGS family. He definitely made my tenure there more enjoyable. I will always remember him fondly." ***Another college, John Clarke, shares these thoughts:*** "I personally worked with Dave for many years. Dave was a skilled geologist who was a significant contributor to defining the stratigraphy of Coastal Plain sediments throughout Georgia and the Carolinas, particularly Paleocene and Late Cretaceous. He served as my geologic mentor, offering insights into how depositional environments affect hydrogeologic frameworks. I owe him a great debt as he helped me define aquifer systems in Georgia's Coastal Plain, such as the Dublin and Midville aquifer systems. He was instrumental in helping revise and improve the understanding of Late Cretaceous sediments along the Savannah River as part of the SRS Trans-River Flow study. Dave's bibliography documents his contributions to structural geology (faults) and stratigraphy. Dave had a great sense of humor and was always there to help out a friend or colleague. He will be missed by all who knew him." ***Another colleague, Bob Faye, commented:*** "Dave was a good friend, a personal mentor and the best example of a professional scientist that I knew during a 42-year career. Dave's knowledge base, his easy-going and affable personality, and his commitment to scientific excellence made him an ideal colleague for a hard-headed, linear-focused engineer who knew nothing about the geology of the southeastern coastal plain. Dave understood, better than many WRD hydrologists, that a geohydrologic framework of aquifers and confining units should correlate with and conform to a geologic framework of unit age, unit sequence, and unit lithology. With great patience, subdued frustration and many hours of explanation and demonstration at outcrops along many back roads of south Georgia, Dave imparted the details of this concept to me; a concept that I applied with much benefit during many subsequent years of professional endeavor. Dave leaves behind not only a highly regarded professional legacy but memories of happy times, friendship, comradeship, and intellectual enlightenment that I will always cherish." ***Lucy Edwards, USGS Palynologist, shares this story about Dave:*** "I'd only been in Reston for a few months. I didn't even have my own office. I had a desk in the office of Ray Christopher while we were all waiting a retirement and a massive office swap. One day Ray started passing around cigars. They said "Congratulations! It's a Zone IV." The joke was that Dave had been sending pollen samples for dating to Ray for a year or two and finally got a productive sample. And that's how I met Dave". After 30+ years with the USGS, David retired and spent more time with his kids and grandkids, all of which he loved dearly. His hobbies included genealogy, knife-making, custom woodworking, and spending time with his loyal dogs, Cinder, Shadow, and Dixie. David was always a great storyteller and jokester, and his sense of humor was known by all. He made wonderful memories with family and friends and will be dearly missed. He is survived by his three children, Tanya, Jason, and Katie, and their mother, Glenda, as well as seven grandkids. A celebration of life will be held at a future date due to Covid concerns and David's wishes to keep everyone healthy.

Carolyn Shoemaker died on August 13, 2021 at the age of **92** years. ***(Sept. 10, 2021 - Tom Wood shared this Facebook post from Henry Chang, dated Sept. 7, 2021).*** She and her husband Eugene Shoemaker made a significant impact (pun intended and it is an understatement) on science, astronomy and the way science views our planet Earth's interaction with near Earth celestial objects, ie. comets and asteroids. Eugene Shoemaker was a scientist with the USGS in the

1960s. He was sent on various surveys of volcanic sites around the country because volcanic sites had been observed to contain relatively high concentrations of uranium. During one of those trips, Shoemaker investigated Meteor Crater in Arizona. He postulated that the formation had been caused by a comet impact rather than a volcanic explosion. At the time, conventional scientific wisdom held that these types of formations were volcanic in nature, even the craters on the moon were thought to have volcanic origins. Shoemaker helped change that, although it took decades before his views were widely accepted. He was worried that Earth was under constant threat of impact from extraterrestrial objects, but until 1994, science paid relatively little heed to the frequency and effects of impacts from comets and asteroids. His wife raised their 3 children and once the nest emptied, she asked her husband if he had any ideas of an intellectually fulfilling way with which she could fulfill her newfound copious amounts of free time. She joined his team which utilized large telescopes to attempt to identify and catalogue comets and asteroids in our near-Earth neighborhood. She tried it out and it turned out she was good at it. The process involved looking at images of the sky taken at different times and seeing if there were any lights which moved. She began doing it 1983 looking at images of the sky taken at different times and seeing if there were any lights which moved and became so adept that ten years later she had discovered hundreds of asteroids and 32 comets. Those numbers represent the most anyone has ever found, making her the world's foremost discoverer of comets and asteroids. That fact, however, isn't the most compelling part of her story. In 1993, she, along with her husband and astronomer David Levy were engaging in one of their all-night hunts at the Palomar Observatory near San Diego, California. She spotted a strange formation described as a "string of pearls" which represented a comet which had fragmented into many pieces and were traveling together in a straight line, like a train, each cometary fragment bound to the others through their gravitational pull. The unusual formation was in and of itself a great and unique discovery, but what took it over the top was it was headed on a collision course with Jupiter. Both the "string of pearls" formation of the cometary fragments (named Comet Shoemaker-Levy 9) and the impending impact of the fragmented comet with a planet are things which humanity had never witnessed. Now, both were being observed at the same time. The multiple impacts of Comet Shoemaker-Levy 9 on Jupiter were just over the horizon, on the far side of Jupiter (relative to the line of sight from Earth) but as the impact sites rotated into Earth's view shortly thereafter, the results were nevertheless extremely impressive. Some of the mushroom clouds generated by the comets burrowing deep into the planet's atmosphere billowed out from Jupiter's sillhouette and were larger than our Earth. The scars on Jupiter were similarly gigantic, persisted for months in Jupiter's atmosphere as dark splotches, and there was no longer any doubting either the frequency of impacts or the tremendous threat they represent. The chances that such an event would happen in the small window of time since humanity has had the technology to detect it (50 years maybe?) *and* be infrequent on a geologic timescale is vanishingly small. Science changed its view on the supposed volcanic origins of impact craters almost overnight. Today, we accept that the moon's impact craters are from comet/asteroid collisions and same for those on Earth. although far fewer are visible on Earth due to geologic processes erasing the visible evidence over time. Carolyn Shoemaker started her new career as an astronomer and became the world's foremost discoverer of comets/asteroids with no academic training (she received her Masters' degree in political science and history) and after she had turned 50 years old (she started at age 51). I find the Shoemakers' story to be one of the most inspiring science has ever produced. It's one of those stories where you say, "if this story were fictional, many might say it's simply too much of a fairy tale. It's not believable." And it is unbelievable. It brings a smile to my face every time I think about it. Carolyn Shoemaker, I salute you.
(Photo is of Meteor Crater, Arizona)

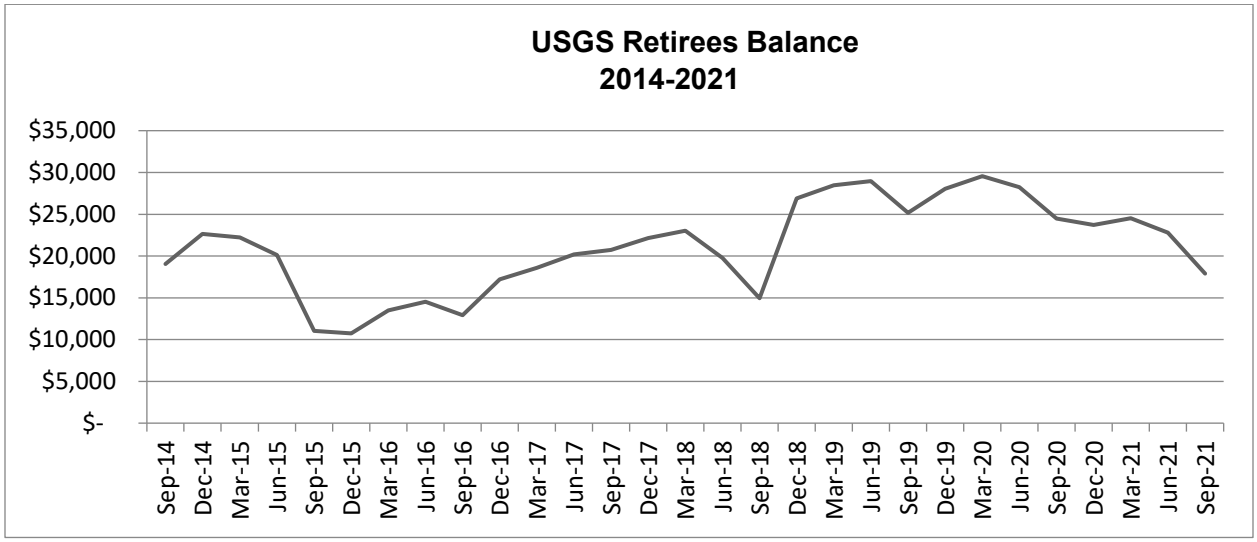
Edwin P. Weeks. 85, passed away peacefully on September 1, 2021, at his home in Parker Colorado alongside his wife, Corki. Ed was an icon in the field of hydrogeology. His research career with the USGS spanned more than 54 years and was marked by creativity and original thinking at all levels. He authored seminal works on groundwater hydraulics, gas movement through the unsaturated zone, and evapotranspiration. He was an inspiration to generations of scientists, unselfishly mentoring many young and early career hydrologists. He will be missed not only for his wisdom and wit, but also for his friendly demeanor and his passionate devotion to science. To quote Ed's 1983 acceptance speech for the O.E. Meinzer Award, "I feel that it is important for each of us as scientists to recognize that we may have to rely on practical application as an excuse for our work, but we should always remember that our true reason for existence is to advance the science." After receiving his Bachelor of Science degree in Geological Engineering from Colorado School of Mines in 1958, Ed began his career with the USGS in Wyoming working on the Wheatland Flats

irrigation study. Four years later, Ed moved to Madison, Wisconsin to manage the Little Plover River project in Central Wisconsin. Results of the study are documented in two written reports and an innovative 16-mm movie produced by Ed entitled, “Little Plover River Project: A Study in Sand Plains Hydrology” (USGS Open-File Report 63-134), The film demonstrates for the general public the importance and complexity of the interconnection between streams and groundwater. In 1968, Ed and family returned to Colorado, where Ed succeeded Bob Stallman as chief of the Multiphase Flow Research Project. Ed briefly served in the Groundwater Branch at headquarters beginning in 1972 and then moved to Lubbock, Texas to oversee a large-scale artificial recharge project. While in Lubbock, Ed initiated a study that measured the propagation of fluctuations in barometric pressure within deep unsaturated zones and used that information to estimate hydraulic conductivity. He also conducted some of the first experiments to use chlorofluorocarbons (CFCs) as tracers in the unsaturated zone. The significance of these research efforts was recognized in 1983 when he was awarded the O.E. Meinzer Award from the Geological Society of America. In 1979, Ed returned to Denver to lead the Unsaturated-Zone Field Studies Project. Ed helped in developing the eddy-correlation method for estimating evapotranspiration and initiated a study of water use by tamarisk in the Pecos River flood plain. Ed's interest in the flow of gases within the unsaturated zone brought him to Yucca Mountain Nevada and the study of the suitability of the site for disposal of high-level radioactive waste. Ed identified an important and previously unreported mechanism for potential radionuclide transport - soil gas movement due to topographic effects. Ed also studied hydraulic properties of coal seams in areas of coal-bed methane development. In addition to the Meinzer Award, Ed was the recipient of the U.S. Department of Interior Distinguished Service Award.

Thomas L. Wicker, 73, of DeKalb, IL, passed away on February 26, 2020, at his home. He was born November 14, 1946, in Watertown, WI, the son of Robert E. and Eva A. (Heiling) Wicker. Thomas married Janet A. Schultz on September 19, 1981, in Watertown, WI. Thomas was a Veteran of the U.S. Navy and was employed as a Hydrologic Field Technician and Supervisor with the USGS for 40 years. He was a member of the American Legion Post 66 where he was a past Commander and served as a member of the Honor Guard for many years. Thomas was also a member of the 40 and 8 and VFW organizations. He was an avid Green Bay Packer Fan, an outdoorsman and a hunter. He is survived by his wife, Janet; two sons, one grandchild who he loved dearly; a brother, two sisters, and nieces and nephews. He was preceded in death by his parents. As per Thomas’s wishes his body was donated to science. Visitation was on March 14, 2020, at Anderson Funeral Home in DeKalb, with Full Military Honors by DeKalb American Legion Post 66.

TREASURER'S REPORT, THIRD QUARTER 2021

Treasurer Cathy Hill reports the organization had $17,906 at the end of the third quarter, 2021, after paying the 6 scholarship winners a total of $7,403. Special thanks for contributions significantly above dues to Kim Rogers. Many thanks for your generosity. These contributions go directly to the Scholarship fund.



DIRECTORY

NEW MEMBERS

Bostwick, Candice M. 'Cindy' (21) – Herndon, VA
Denver, Judith M. 'Judy' (18) – Lewes, DE
Halford, Keith J. (18) – Carson City, NV
Hanson, Randall T. 'Randy' (18) (Anna D.) – San Diego, CA
Hickman, Stephen H. 'Steve' (21) (Karen Garrison) – Redwood City, CA
Holms, Robert R. 'Bob' (21) (Joanne) – Rolla, MO
Kane, Richard L. (19) (Laurel) – Wesley Chapel, FL
Nelson, Jonathan M. 'Jon' (21) (Aimee) – Arvada, CO
Peltz-Lewis, Lori A. (19) (Ralph-Lewis) – Auburn, CA
Shay, Janice (20) (Jeff) – Shenandoah Junction, WV

AFFILIATE

Schmid, Lorna A. (A) (David Boldt) – Herndon, VA
Boldt, David (A) (Lorna Schmid) – Herndon, VA

AFFILIATE LIAISONS

Wilson, Kenneth V. 'Van' (18) (Kim) – delete **(CORRECTION: Van was incorrectly listed as a new Affiliate Liaison in NL192, and should be reflected as a new state representative – see below)**

DIRECTORY CHANGES

Cummings, Harriet (S) (Timothy G. Rowe) – corrections of phone no and email
Fitzpatrick, Daniel J. (05) – change of address and phone no
Straka, Darla E. (03) (James) – change of address

STATE REPRESENTATIVE

Mississippi Van Wilson jvwilson@usgs.gov (w) 601.933.2922
(CORRECTION: Van was incorrectly listed as a new Affiliate Liaison in NL192, and should be reflected as a new state representative)