



# MODERN HYDROLOGY

AGU HYDROLOGY  
SECTION NEWSLETTER

*On the cover:  
See page 01*

MARCH 2025







# From the Section Secretary

JENNY DRUHAN

Dear AGU Hydrology Section,

I’d like to take a moment to highlight our Technical Committees (TCs), which are a cornerstone of our community’s engagement and a key means by which we ensure recognition and promotion of the latest scientific advances. If you’ve been involved in a TC before, you already know the impact they have. But if you’re new to the idea, let me share a bit about them in hope of sparking your interest.

Our TCs serve as hubs for research collaboration and knowledge sharing, each focused on a specific subfield of hydrology. They are typically composed of 10-30 active members, and work to organize AGU Fall Meeting sessions appropriate to their subdisciplines, lead community discussions, and contribute to synthesis papers. These activities help shape the direction of their fields and guide future research priorities. They are also instrumental in professional development and outreach. TCs mentor early-career scientists, provide networking opportunities, and recognize outstanding contributions through awards and honors. Each of our TCs make use of an annual budget enabling a variety of activities such as photo contests, social events, micro-grants and travel awards.

Importantly, our TCs are not exclusive clubs. They are open to anyone interested in contributing and sharing their enthusiasm for hydrology. If you're looking for ways to get more involved, joining a TC is an excellent entry point, as it was for me personally. Our active TCs cover a broad range of topics, including Catchment Hydrology, Ecohydrology, Groundwater, Hydrologic Uncertainty, Hydrogeophysics, Precipitation, Remote Sensing, Soils and Critical Zone, Unsaturated Zone, Water and Society, and Water Quality. You may even wish to explore something new in our latest addition: Distributed Sensing, which launched this year.

I encourage you to take a look at what our TCs are doing ([visit here](#) or page 9 of this issue). You may just find a group that inspires you. I hope you will consider joining the conversation and contributing to the vibrancy of our section.

Kind wishes for the year ahead,  
Jenny Druhan

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## On the cover:

This issue’s cover features part of Figure 1 from Peter S. Eagleson’s 1994 paper, “[The Evolution of Modern Hydrology](#)”, showing the Nile River from space (Earth Satellite Corp., GEOPIC). This “dark ribbon” through the desert highlights humanity’s reliance on water, shaping civilizations for millennia. Inspired by Randy Koster’s Fellows Speak, this cover honors Professor Eagleson’s impact in defining modern hydrology as an Earth system science. This theme runs throughout the issue—from Section Secretary Jenny Druhan’s overview of AGU Hydrology’s technical committees to discussions on aquifer sustainability, interdisciplinary water projects, and ecosystem resilience in extreme hydroclimates.



# From the AGU Meetings Committee

DEB GLICKSON,  
COMMITTEE CHAIR



Hello Hydrology Section!

I'm excited to talk with you about the AGU Meetings Committee, which I chair. The Meetings Committee is probably one of those volunteer committees you've never heard of — we are not a program committee for a specific AGU meeting, but rather provide the AGU Board and Council input into meeting strategy on a broad scale. Part of that input includes hearing from AGU membership on key meetings issues.

Our charge is to “recommend criteria and policies that support AGU’s meeting goals, ensure the scientific direction and scope of AGU meetings are consistent with AGU’s overall strategy and is reflective of Earth and space science, secure the appointment of program committee chairs, and review the annual performance of meetings.” We’ve focused our last year of work on two main topics: a portfolio approach to meetings and transparently communicating about meeting costs.

The Meetings Committee is working closely with AGU staff to examine the entire portfolio of AGU-supported meetings, from the largest (our Annual Meeting), to mid-size meetings like the Ocean Sciences Meeting and WaterSciCon, to small meetings like the Triennial Earth-Sun Summit. By examining the scientific rationale, audience and attendance, and meeting outcomes, the Meetings Committee can provide helpful advice to staff on possible changes in direction that could benefit AGU members as a whole.

As I mentioned earlier, we know that one of the most talked-about topics of the last few years has been meeting cost. We’ve been working with AGU staff to emphasize the importance of transparent communication around cost. Even though we have all felt the sting of inflation in the past few years, many people don’t know that the hospitality industry has been impacted on a number of fronts — supply chain issues, increased labor costs, difficulty finding and retaining staff, and higher shipping and transportation costs. Obviously, this has a significant impact on meeting costs. Additionally, AGU members value sustainability, and sustainable packaging and low-emission supply chains are more expensive options than less sustainable ones. Finally, our registration costs often support free or discounted registration rates for others, including undergraduate and graduate students, attendees from tribal and territorial colleges, and attendees from lower- and middle-income countries.

The Meetings Committee would be interested in hearing from you on these or other topics.

The Meetings Committee membership can be found here: <https://www.agu.org/learn-about-agu/about-agu/governance/committees/meetings-committee>. Members serve 2-year terms; selection is made by AGU staff.

Thank you so much!

Deb Glickson



# Awardee Speaks

PETER S. EAGLESON  
HYDROLOGIC  
SCIENCES AWARD

## Randy Koster



Professor Eagleson and I on the day of my doctoral defense in 1988, back when I had hair!

In 2024, the Hydrology Section’s Hydrologic Science Award was renamed the Peter S. Eagleson Hydrologic Sciences Award, a fitting tribute to the man who helped transform hydrology into a global, Earth system science. Before Eagleson’s time, hydrology was largely engineering-focused, not yet fully placed into the context of how our planet functions as a whole. Through his landmark textbook *Dynamic Hydrology*, his seminal *Water Resources Research* papers in the 1970s, his leadership behind the 1991 NRC report “Opportunities in the Hydrologic Sciences”, and more, Eagleson gave global-scale hydrology a prominence that it never before enjoyed. He was a true hydrologic giant, a true pioneer.

My selection as the 2024 award winner thus held special meaning for me, since Eagleson was my doctoral advisor. Naturally he taught me about the inner workings of the global hydrological cycle. He also revealed to me, though, something else – something just as valuable: the joy intrinsic to hydrologic science, the joy of uncovering previously unknown connections amongst the world’s hydrologic processes. I glean from our interactions that he experienced a sort of “explorer’s thrill” when he jumped into a previously unstudied problem and revealed connections that helped the world make more sense. He passed on the joy of discovery to me, and though I don’t pretend to come anywhere near his successes, I am grateful for that to this day.

I’ve spent my entire post-student career at the NASA Goddard Space Flight Center in Greenbelt, MD. It is a remarkably invigorating place to work, filled with top-notch scientists in all branches of Earth science. Most of my scientific research, made possible by multiple collaborations, has focused on developing land surface parameterizations for Earth system models and on studying how land processes (e.g., soil moisture variations) interact with the rest of the climate system. It has been a wonderful career, and if I were sent back in time and given the choice, I’d choose the same path in a heartbeat.

From the vantage point of age, perhaps I can offer some advice to new researchers out there, advice that I’m effectively passing on from Eagleson himself: cultivate the joy of discovery and savor the exhilaration of testing heretofore unexplored ideas. In my own experience, most of the ideas won’t work, but still – it’s exciting! Obviously every job has its good and bad aspects, but as long as there’s some discovery involved, and as long you’re mindful of the joy therein, you should find the job fulfilling.





# Fellow Speaks: Michael Gooseff

## EVOLUTION OF A HYDROLOGIST

I am writing this at a field camp in the Dry Valleys – the largest ice-free region of Antarctica. Out the window, glaciers generate streamflow for ~10 weeks in the relatively warm austral summer and I can see one of the 17 stream gages our research group operates. Streambeds here are covered with “shag carpets” of cyanobacteria, providing habitat for diatoms and microinvertebrates (e.g., tardigrades). These organisms all suspend their lives during the cold, dark winters between flow seasons. Streamflow transports solutes downstream and through the streambed for uptake and cycling; it also drives streambed sediment weathering, and glacial melt contributes water to closed basin lakes on the valley floors.

Our hydrologic measurements and studies of hyporheic exchange, for example, support the evolving knowledge of the resilience of this ecosystem and form a basis for generating and testing hypotheses.

I first came to the dry valleys as a PhD student and learned to become a field hydrologist in the late 1990s. I am fortunate to continue to conduct research here following in the footsteps of my collaborators and mentors. After my PhD work, I sought to work in the Arctic and was very lucky to initiate a new collaboration with colleagues who had been working there for some time. Additional collaborations developed and together we got to explore (among other themes) nutrient cycling through river networks, using geophysics to image the movement of surface water in the subsurface, and more recently, conducting Lagrangian water quality surveys along the rivers to explore the dynamics of water quality and hydrology.

“I would never have predicted this trajectory of my career, and frankly, so much of it evolved idea by idea, proposal by proposal (even the ones that weren’t funded), collaboration by collaboration, and student by student.”

I would never have predicted this trajectory of my career, and frankly, so much of it evolved idea by idea, proposal by proposal (even the ones that weren’t funded), collaboration by collaboration, and student by student. A constant throughout my career has been the great fortune of having phenomenal collaborators and students from whom I have learned so much about relationships, communication, and tenacity.

Recently, I have come to value the facilitation of others’ success in science beyond my research group. In taking on new roles I get to support others’ success in generating ideas, teaming, proposal craft, research execution, publication, and communication – while also supporting a field research program of my own. I’m still trying to learn to live by a few rules to make myself and the world a little better: 1) compliments are free so give them freely, 2) there is more to everyone than meets the eye, and 3) asking questions >> making statements.



# Charting Paths Forward for a Heavily Stressed Aquifer

JIM BUTLER, KANSAS GEOLOGICAL SURVEY, UNIVERSITY OF KANSAS

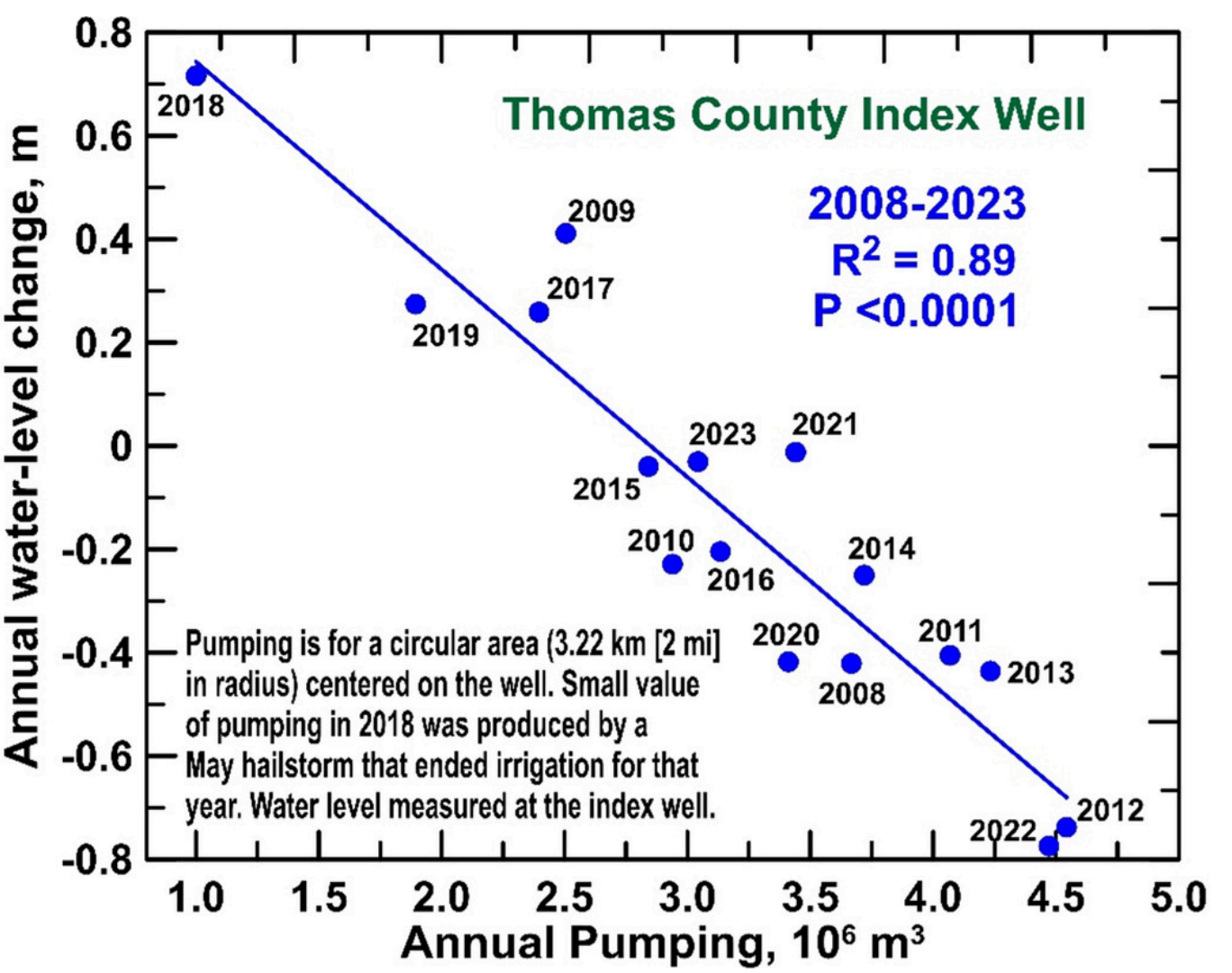
Addressing the depletion of aquifers that support irrigated agriculture and provide drinking water for millions is a global challenge. Like many regional aquifers, the High Plains aquifer (HPA) in western Kansas is under stress produced by decades of intensive pumping for irrigation. The large water-level declines pose an existential threat to the viability of irrigated agriculture and the rural communities that depend on it. There is only one option to reduce that threat in the near-term: pumping reductions in conjunction with modification of agricultural practices. How much reduction is needed is the key question.

An [assessment](#) of data from a network of Kansas Geological Survey (KGS) continuously monitored index wells found indications of a steady net inflow to the areas around those wells. Using the KGS database of annual water-level measurements (about 1,400 wells) and annual pumping data (all non-domestic wells are metered), we found strong linear relationships between annual pumping ( $Q$ ) and water-level change ( $\Delta WL$ ) from the local (Figure) to regional (up to 21,000 km<sup>2</sup>) [scale](#), an indication that a steady net inflow is likely a common feature across the Kansas HPA. This led us to develop a [method](#) to calculate net inflow from a plot of  $Q$  versus  $\Delta WL$ . If water levels are to be stabilized for the next one to few decades, pumping must be reduced to net inflow ( $Q_{stable}$ ).

[Results](#) from groundwater conservation areas in western Kansas demonstrated the potential of the  $Q_{stable}$  framework for [broad application](#). The path to widespread use, however, required us to move far beyond papers in peer-reviewed journals.

In the last decade, we have given numerous presentations to irrigator groups, groundwater managers, legislative committees, and many others. We have also written for non-technical audiences

ranging from the general public to [theologians](#). As a result,  $Q_{stable}$  is commonly invoked by agricultural groups and legislators in Kansas and is being widely adopted as the target for conservation efforts. Although reductions to  $Q_{stable}$  will not attain sustainability in most areas, they will exploit the inertia in unconfined aquifers with deep water tables to buy time to develop longer-term strategies and thus serve as [initial steps](#) on a path to more promising conditions in the western Kansas HPA.



Want to showcase hydrology research making a real-world impact? Nominate yourself or a colleague for an upcoming “Science to Solutions” feature by emailing us at [agu.hydro.news@gmail.com](mailto:agu.hydro.news@gmail.com).



# Sister Organization

STEVE BURIAN, AWRA DIRECTOR



## A MULTIDISPLINARY ORGANIZATION

For more than 60 years, the American Water Resources Association ([AWRA](#)) has been serving as a catalyst in developing innovative water resources solutions through collaborative, multidisciplinary engagement of representatives from government, academia, business, and the nonprofit community. Engineers, hydrologists, scientists, sociologists, policy analysts, land planners, community advocates, and others interested in water resources attend AWRA conferences, share their work through AWRA publications, and collaborate through technical committees to create robust water solutions.

## SHARING ADVANCES IN WATER SCIENCE AND MANAGEMENT

AWRA publishes the Journal of the American Water Resources Association ([JAWRA](#)), a well-respected bi-monthly peer-reviewed publication featuring high-quality original papers that examine multidisciplinary solutions related to water. Published for more than 55 years, JAWRA is one of the oldest water resources journals in the United States. It has over 6,000 subscriptions globally and receives over 150,000 downloads each year.

## SERVING THE WATER PROFESSION

[AWRA’s Technical Committees](#) provide a platform for collaboration and service to the scientific community and society. These committees are open to you:

- Future Risk — This committee focuses on quantifying risks, developing strategies to adapt to changes, and advancing the effective management of water quality, quantity, conflict, and cybersecurity threats to safeguard our communities and ecosystems.
- Integrated Water Resources Management (IWRM) – The goal of this committee is to foster an ongoing conversation about making IWRM the standard of practice in water resources management.
- Policy — This committee assists the AWRA Board in taking a national and international leadership role in formulating water-resource policy and translating science into action.
- Technology — This committee explores innovations in technology, analytical tools, and data services in water resources.

## ENGAGING THE WATER RESOURCES COMMUNITY

Upcoming Conferences:

- [2025 Spring Specialty Conference](#), “Development Risks & Challenges in Changing Climate Conditions,” will convene in Anchorage, Alaska from April 28-30, 2025, and exchange design experience, examine key science advances, discuss policy, and tour unique landscapes and water resources systems. [Register](#) now and plan to attend.
- [2025 Annual Water Resources Conference](#) will be held from November 10-12, 2025, in Westminster, Colorado: An opportunity for higher-level networking, engagement, and learning about key water issues.
- [2026 Geospatial Water Technology Conference \(GWTC\)](#), in Niagara Falls, NY, from May 18-20, 2026: A regular specialty conference that explores novel data-science applications to address water challenges.

We invite you to join us and connect with water resources professionals and students through our local networking opportunities and AWRA e-news. Please [sign up today](#), and check us out online [here](#). Together, we’ll explore the world of water and its exciting opportunities in policy, program, and practice.



# AGU Hydrology Books

TWO NEW BOOKS  
AND ONE FREE  
MEMBER EBOOK ON  
HYDROLOGY



## AGU RECENTLY PUBLISHED TWO BOOKS OF INTEREST TO THE HYDROLOGY SECTION:

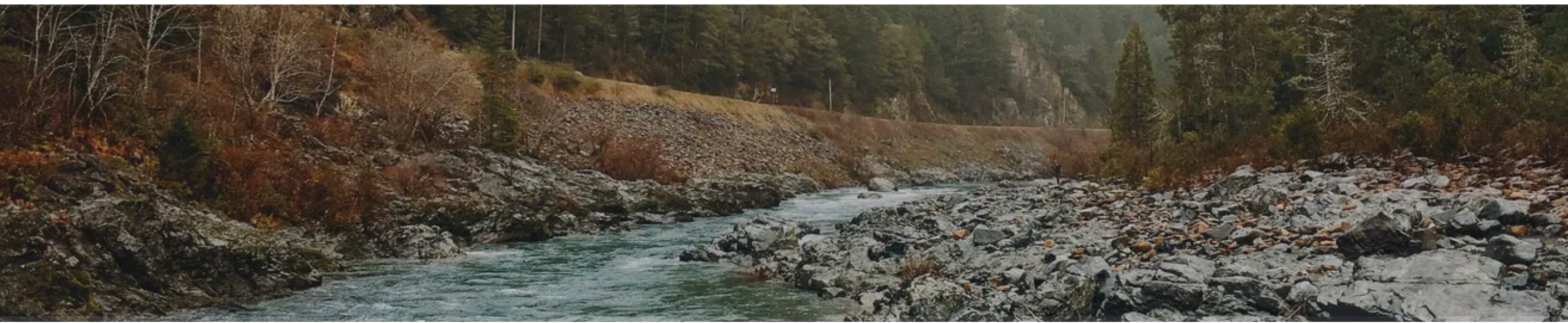
- [Landscapes on Fire: Impacts on Uplands, Rivers, and Communities](#) by Ellen Wohl presents an overview of wildfires and their after-effects on different parts of the natural, biological, and human landscape, including river networks.
- [Advanced Hydroinformatics: Machine Learning and Optimization for Water Resources](#), edited by Gerald A. Corzo Perez and Dimitri P. Solomatine, demonstrates how machine learning can advance data analytics, modeling and forecasting, and knowledge discovery for better water management.

All books can be purchased at <https://www.wiley.com/en-us/shop/agu>, where AGU members receive a 35% discount using the code AGUME at checkout.

If your institution has a subscription to the [Special Publications](#) series, you can access these books via Wiley Online Library.

Every quarter, AGU offers one free ebook to members. Through March 2025, the complimentary ebook is [Threats to Springs in a Changing World: Science and Policies for Protection](#), edited by Matthew Currell and Brian Katz, which illustrates the causes of spring degradation and strategies to safeguard springs. Log in to your [AGU member profile](#) and find “Member Benefits” on the Membership tab to access this benefit.





## Community Announcements

### AGU HYDROLOGY SECTION JUSTICE, EQUITY, DIVERSITY, AND INCLUSION (JEDI) COMMITTEE

The AGU Hydrology Section Justice, Equity, Diversity, and Inclusion (JEDI) Committee is going strong and recruiting new members!

Our next monthly meeting is Friday (3/21) from 9-10am PT; 12-1pm ET, and all are welcome to attend. Our meetings are happening every third Friday of each month at 9-10am PT; 12-1pm ET.

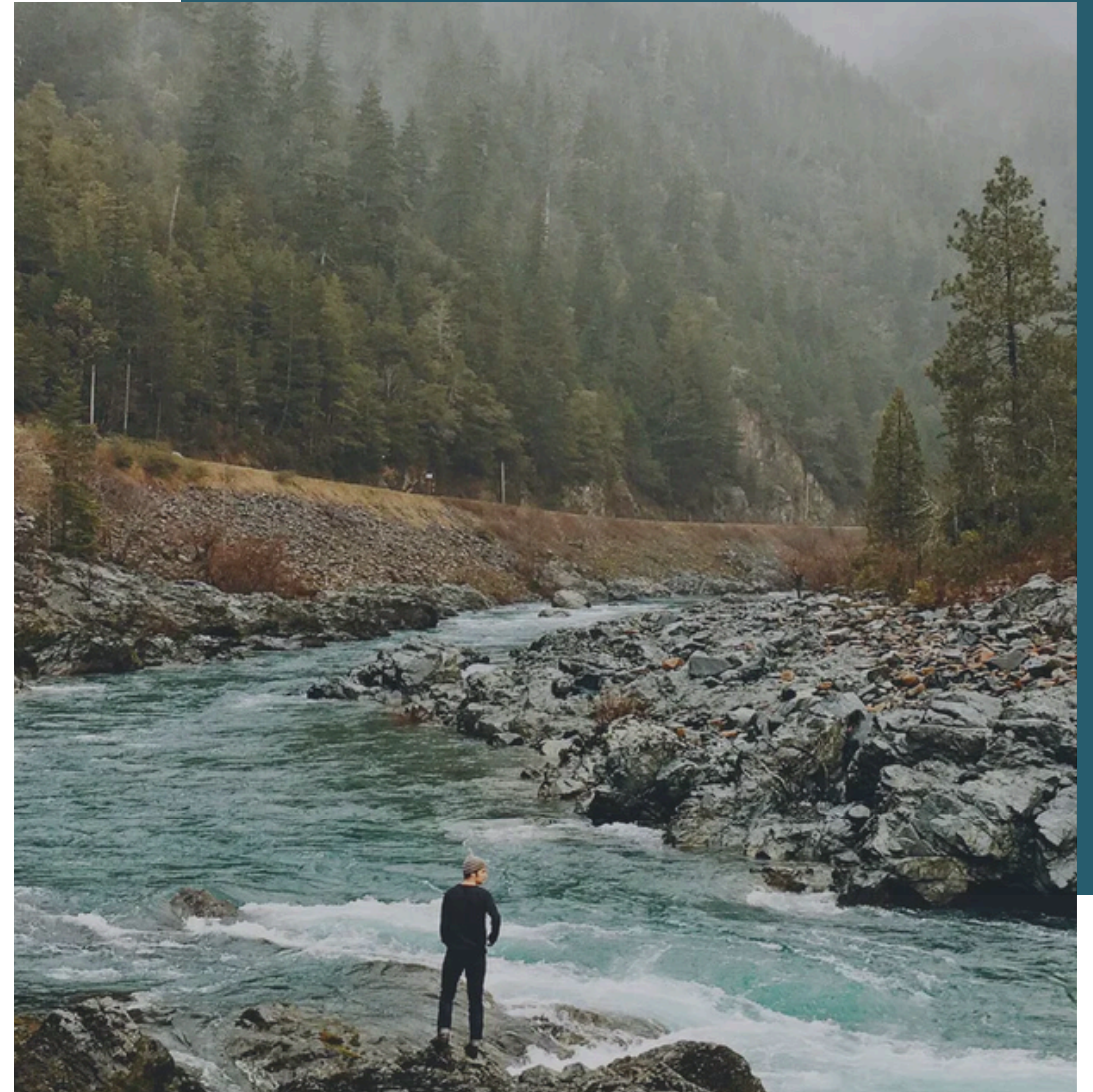
At AGU24, we had a successful town hall and a very collaborative learning session where we discussed overcoming hurdles in JEDI work with other AGU committees, and we are preparing to host these again at AGU25 in New Orleans, as well as preparing for JEDI outreach initiatives. Email us at ([aguhydrojedi@gmail.com](mailto:aguhydrojedi@gmail.com)) to be on the email list to get updates.



# Open Channel

Email:

[agu.hydro.news@gmail.com](mailto:agu.hydro.news@gmail.com)



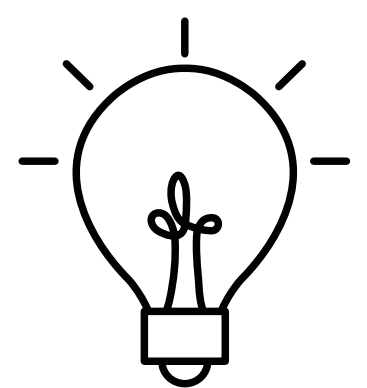
## WE'VE HEARD YOU!

The Science to Solutions section (highlighting research with real-world impacts) is now a priority feature. Many also expressed interest in Hydrology Horizons (emerging trends, transformative technologies), so we're curating more content for future issues.

We'd love more feedback and nominations—help shape the newsletter by filling out this brief survey ([HERE](#)). All questions are optional, and your input is invaluable. Thank you for your time and insights!

## CALLING ALL CREATIVES

Submit your hydrology-related art, poems, landscape photographs or other creative pieces via email ([agu.hydro.news@gmail.com](mailto:agu.hydro.news@gmail.com)) to be featured in an upcoming edition.



## ANONYMOUS COMMENT JAR



Favorite part of this issue?  
Thoughts on future issues?  
Nominations for contributions?

Drop your comments in the jar ([HERE](#))—anonymously if you prefer.





# Community Links

## AGU Hydrology Section

Website: [connect.agu.org/hydrology](https://connect.agu.org/hydrology)  
BlueSky: [@hydrology-agu.bsky.social](https://bsky.app/profile/@hydrology-agu.bsky.social)  
X: [@Hydrology\\_AGU](https://twitter.com/Hydrology_AGU)

## Technical Committee Links

### HYDROLOGY SECTION JUSTICE, EQUITY, DIVERSITY, AND INCLUSION (JEDI) COMMITTEE

Website: [connect.agu.org/hydrology/about/tc-committees/hydrojedi](https://connect.agu.org/hydrology/about/tc-committees/hydrojedi)

### HYDROLOGY SECTION STUDENT SUBCOMMITTEE (H3S)

Website: [agu-h3s.org](https://agu-h3s.org)  
X: [@AGU\\_H3S](https://twitter.com/AGU_H3S)  
LinkedIn: [@american-geophysical-union-hydrology-section-student-subcommittee-h3s](https://www.linkedin.com/company/american-geophysical-union-hydrology-section-student-subcommittee-h3s)

### PRECIPITATION

Website: [connect.agu.org/hydrology/about/tc-committees/pretech](https://connect.agu.org/hydrology/about/tc-committees/pretech)  
Facebook: AGU Precipitation  
X: [@AGUPrecip](https://twitter.com/AGUPrecip)  
Instagram: [@AGU\\_precipitation](https://www.instagram.com/AGU_precipitation)  
Linkedin: AGU Precipitation

### CATCHMENT HYDROLOGY

Website: [hydrocatch.weebly.com](https://hydrocatch.weebly.com)  
X: [@AGUCatchHydro](https://twitter.com/AGUCatchHydro)

### SOIL PROCESSES AND CRITICAL ZONE

Website: [connect.agu.org/biogeosciences/tc-committees/soils-spcztc](https://connect.agu.org/biogeosciences/tc-committees/soils-spcztc)

### ECOHYDROLOGY

Website: [connect.agu.org/hydrology/about/tc-committees/ecohydrologymain](https://connect.agu.org/hydrology/about/tc-committees/ecohydrologymain)  
X: [@AGUecohydro](https://twitter.com/AGUecohydro)

### REMOTE SENSING

Website: [connect.agu.org/hydrology/about/tc-committees/remote-sensing](https://connect.agu.org/hydrology/about/tc-committees/remote-sensing)  
LinkedIn: AGU Hydrology Section’s Remote Sensing Technical Committee group

### GROUNDWATER

Website: [connect.agu.org/hydrology/about/tc-committees/groundwater](https://connect.agu.org/hydrology/about/tc-committees/groundwater)  
X: [@AGU\\_GWHydro](https://twitter.com/AGU_GWHydro)

### UNSATURATED ZONE

Website: [connect.agu.org/hydrology/about/tc-committees/unsat](https://connect.agu.org/hydrology/about/tc-committees/unsat)  
X: [@UnsatHydro](https://twitter.com/UnsatHydro)

### HYDROGEOPHYSICS

Website: [connect.agu.org/hydrology/about/tc-committees/hydrogeophysics](https://connect.agu.org/hydrology/about/tc-committees/hydrogeophysics)  
X: [@AGUhydrogeophy](https://twitter.com/AGUhydrogeophy)  
Instagram: [@aguhydrogeophysics](https://www.instagram.com/aguhydrogeophysics)

### WATER AND SOCIETY

Website: [connect.agu.org/hydrology/about/tc-committees/water-and-society](https://connect.agu.org/hydrology/about/tc-committees/water-and-society)  
X [@AGU\\_WS](https://twitter.com/AGU_WS)  
Google: [groups.google.com/agu-water-and-society](https://groups.google.com/agu-water-and-society)

### HYDROLOGIC UNCERTAINTY

Website: [hydrouncertainty.org](https://hydrouncertainty.org)  
X: [@AGU\\_HU](https://twitter.com/AGU_HU)

### WATER QUALITY

Website: [aguwaterquality.org/](https://aguwaterquality.org/)  
X: [@AGU\\_WQ](https://twitter.com/AGU_WQ)