

MEET THE MEMBER - ARDEN WELLS - ASSOCIATE GEOLOGIST

Area of Expertise: groundwater management, groundwater quality

Years' Experience: 5 years

Nationality: American

GWR Joining Date: March 2018

Number of GWR projects completed: 4

GWR Projects: preparation of two 'iron in groundwater' briefing notes to support water supply efforts in Cox Bazar; data digitization for Yemen groundwater database; supervised the drilling of a well field in Teknaf, Bangladesh as part of the Teknaf Groundwater Project.



Reviewing drill cuttings with GWR drilling supervisor Ali.

PROFESSIONAL BACKGROUND

An introduction to your background in groundwater...

I studied geology for my undergraduate degree at the University of Texas at Dallas and then Earth System Science, specializing in hydrogeology, at Stanford University for my master's degree. My thesis was focused on understanding how agricultural processes and management decisions can affect the release of uranium from aquifer sediments in California's Central Valley. Since grad school, I've been working at Todd Groundwater, a small groundwater resources consulting company based near San Francisco, California, for five years.

A brief overview of your day job outside of GWR...

I am a geologist at Todd Groundwater, a small groundwater resources consulting group based near San Francisco. Most of our clients are agricultural communities in California who depend on groundwater for their drinking water and irrigation needs. We do the scientific analyses needed to help them understand and plan for their future groundwater resources, as well as comply with state laws.

A lot of my work is related to the Sustainable Groundwater Management Act, a set of bills in California that require stakeholders like cities, water agencies, land-owners, disadvantage communities, and Native American tribes to work collaboratively to meet groundwater sustainability goals by the year 2040. We worked with several of these interdisciplinary agencies to help write these Groundwater Sustainability Plans, and now help them implement these plans by evaluating the water budget and sustainability criteria in annual reports, designing monitoring well networks, planning recharge projects.

My favourite part of my job is getting to analyze data and communicate it in a way that helps policymakers make informed decisions. For many of the agencies I work with, sustainable groundwater management requires them to make difficult, collaborative decisions. I like knowing that our work can help give them the tools they need to best serve their communities.

Your inspiration in pursuing a career in groundwater...

I grew up near New Orleans, Louisiana. My community was heavily affected by the Deep Horizon Oil Spill, which got me interested in environmental science. I wound up writing a report about arsenic in Bangladesh groundwater for my high school senior project. My undergraduate university didn't have an environmental science program, so I decided to study geology instead. I also thought it would be funny to study groundwater because my last name is Wells. Fortunately I found the field fascinating and felt that it was a great career that would both do some good for our planet and have a high demand throughout my life.

INSIGHTS AND EXPERIENCES

A particularly challenging groundwater issue you've encountered and how you addressed it... one of my favorite recent studies required us to identify how much groundwater contributed to agricultural drains in a basin. It led to some philosophical questioning of "what is groundwater?" We approached this question through water level and water quality analyses. We analyzed the vertical flow of groundwater and used piper diagrams to compare the drain water to shallow groundwater, deep groundwater, and canal water.

What you believe to be the most pressing challenges related to groundwater and water supply today.. many people and communities have built their livelihoods on groundwater use at a rate that isn't sustainable in the long term. Difficult decisions and sacrifices will need to be made. The biggest challenge is making sure that these decisions are made in a peaceful and equitable way. Hydrogeologists can provide key expertise so that these decisions are made with the best available data and scientific understanding.



Working with the drillers at a production borehole in Bangladesh.

Where you find the most enjoyment working in groundwater... I like how geologic and water level data can serve as little puzzle pieces that allow you to envision the big picture.

The best piece of advice you have ever received... I was told this regarding drilling, but I think it's relevant to most scientific work: Make sure you understand the basic physical processes behind your work. If you are faced with a new process or equipment you don't understand, go back to your basic physical understanding and extrapolate from there.



Reviewing cutting samples for an aquifer storage and recovery well in Monterey, California.

The alternative career path you would have chosen if you weren't a hydrogeologist... probably a soil scientist! Is that cheating because it's too similar? Otherwise, maybe a therapist or a journalist.



Arden showing off the national flower of Bangladesh, a gift from the drillers!

GWR INVOLVEMENT AND ADVICE



Arden showcasing one of the monitoring wells completed as part of the Teknaf Groundwater Project

Advice you would give to someone aspiring to get involved at GWR... For in-person projects, talk to your employer about your interest in working with GWR. I saved up paid time off that I hadn't used during the pandemic. Todd Groundwater was extremely flexible in helping me take the time off and working with the project's shifting schedule.

Also make sure you try to connect with people, even though a language barrier. Start with kindness, humility, and curiosity.

If that doesn't work, it's OK to be a bit annoying. I faxed the Bangladesh consulate a picture of my emails because they wouldn't reply to me and I needed my visa. I quickly got a call back.

What motivated you to join GWR's membership...
I wanted to get involved in international hydrogeology work and contribute my skills in a positive way.

The most rewarding project you have worked on with GWR... definitely my work in Bangladesh! I was able to meet so many incredible people. From the GWR team to Bangladeshi, Rohingya, and international NGO friends I made, I had the opportunity to connect with people I wouldn't normally get to meet.

A memorable experience from your work with GWR... one of the drilling supervisors we worked with in Bangladesh, Zahed, is a Rohingya refugee. He was a hard-working and friendly guy dedicated to his family, and he was a joy to work with. Since my trip to Bangladesh in 2022, we have stayed in touch. Last year, the United States launched a program called Welcome Corps, where Americans can sponsor refugees they already know for resettlement. Six friends and I formed a sponsorship team for Zahed's family. It's a long process, but we've gotten through the first few steps and are hopeful that his family will be able to become our neighbors and find safety in the United States. If they do get to resettle here, we will help them find an apartment, learn English, navigate government resources and public transport, access healthcare and education, and find employment.



Celebrating with the drillers after successfully developing TGP Production Borehole 1

How being an active member of GWR has benefitted you professionally and personally... I don't feel bad telling the American drillers to get their act together and follow the technical specifications because I've seen Bangladeshi drillers do a better job using cow dung as drilling fluid and a rig made out of bamboo.

Hopes for contributing to the GWR community in the future... I hope I can continue to stay engaged with projects as they come up. It might be hard for me to pull off taking off two full months again, but I could probably make a shorter in-person project work.

DID YOU KNOW?

After suffering from several bouts of food poisoning whilst working in Bangladesh, Arden was inspired to write in to the podcast "Risky or Not Risky", questioning her love for Singara and if this may have been the cause of her sorrows.

THE VERDICT?

Not risky...

Listen to the podcast [here](#)



Enjoying Fuchka outside Dhaka University.