



EAHCP STEWARD

News from the Edwards Aquifer Habitat Conservation Plan - March-April 2024



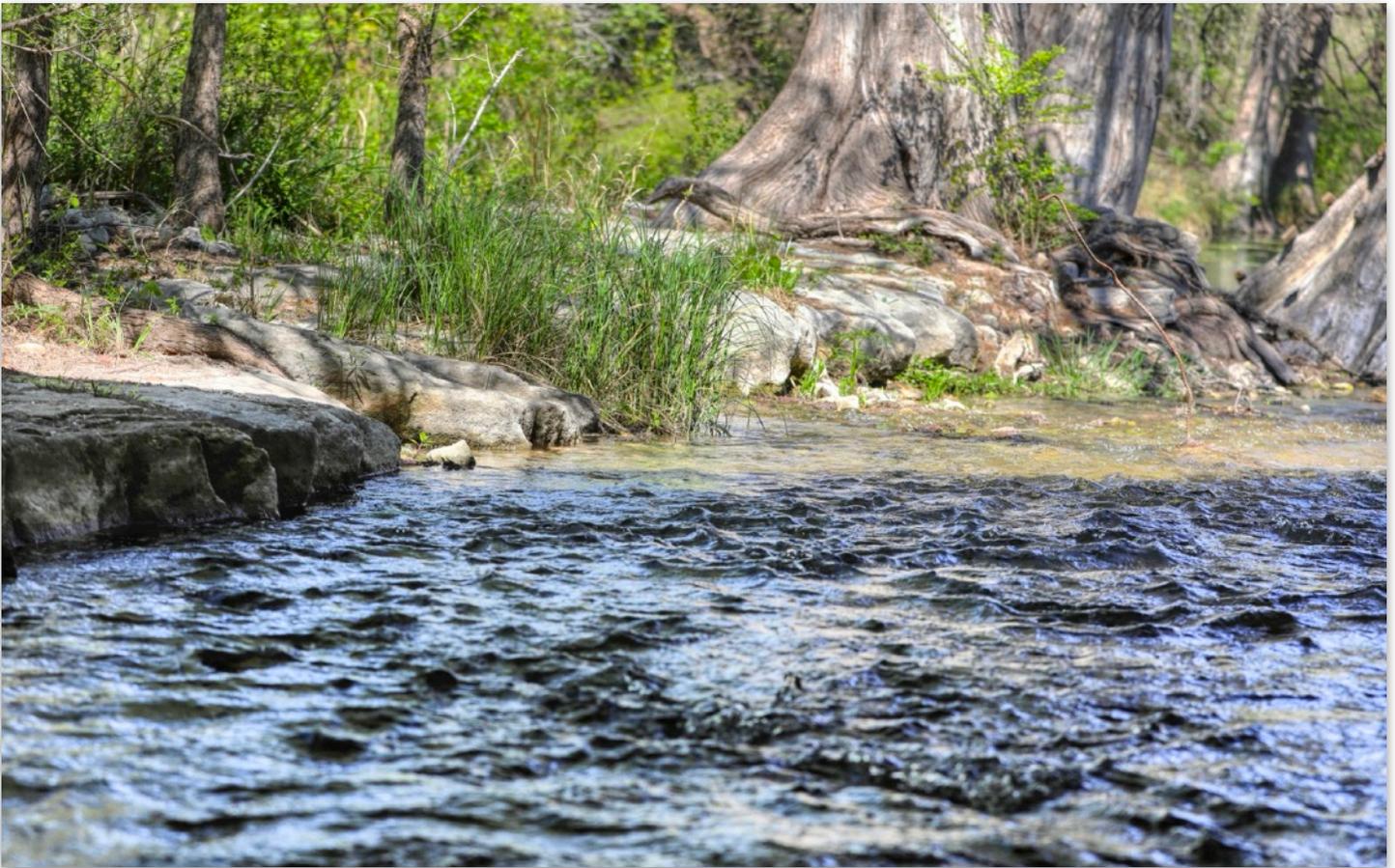
Chasing Change

EAA Scientists Projecting Climate Change Impacts in Edwards Aquifer Region

Pictured from left to right: Changbing Yang, Paul Bertetti, Logan Schmidt, Hakan Basagaoglu, Maryam Samimi

Computer models are exceptionally precise tools. Projecting what an evolving climate might look like in 30 years is anything but defined. So, what if you were tasked with figuring out how the weather, driven by the climate patterns three decades from now, will impact endangered species living in South Texas. Impossible task?

Chasing Change - Continued



“Well, this scenario of predicting how climate patterns three decades from now looks fairly daunting at face value. But, when you consider that we have some great existing data sets and outstanding scientists in the climate change field to work with, the thought of delivering useful information to decision makers becomes a little more practical,” said Paul Bertetti, who leads the hydrological modeling team at the Edwards Aquifer Authority (EAA). “But make no mistake, this is a steep hill to climb. However, our team is capable and confident, and based on our current progress, we should be able to get this work accomplished in an efficient and effective manner.”

As the Edwards Aquifer Habitat Conservation Plan (EAHCP) federal permit is up for renewal in 2028, the U.S. Fish and Wildlife Service (USFWS) will be examining how the new permit will address climate change in the application. At this point, USFWS guidelines are fairly general, so it will be up to the EAHCP permittees to define a scientific approach they think is the best way to move forward. And that is what Bertetti’s team is currently working on.

Bertetti explained that they have a good computer model that can mimic the hydrologic flow of water in the Edwards Aquifer based on measured recharge. However, recharge data reflects what has happened in the past, so determining projected recharge relies on how climate statistics are applied to the computer model.

“Within the last few weeks, we have developed a methodology that we think will work well. So, in the coming months we will be applying the best climate projections available to the Edwards Aquifer hydrologic model in order for us to put forth some sound recharge numbers over the proposed life of the next federal permit,” Bertetti noted. “Recharge is what drives the amount of springflow at the Comal Springs and San Marcos Springs over time. And recharge is determined by amounts and frequency of rainfall. Rainfall is dependent on the particular climate pattern of the time.”

Chasing Change - Continued

Bertetti's team worked closely with South Central Climate Adaptation Science Center to develop climate models specific to the Edwards Aquifer Region. He also said they had great success in partnering with the artificial intelligence machine learning team at the University of Texas at San Antonio (UTSA). They have helped the EAA team develop some modeling techniques for converting precipitation into recharge data for now as well as into the future. Additionally, Bertetti credited the U.S. Geological Survey for the excellent recharge data they have collected over the past 80 years for its importance to the process.

So, what has Bertetti's team seen after a few years' worth of work?

"At this point, we don't have a good feel for how the aquifer system will respond, but we have done a lot of analysis of what the climate models are projecting for the Edwards Region. No matter what scenario you pick for how the region will grow and develop, it looks like average temperatures will increase anywhere from two to four degrees Celsius. Both the minimum and maximum temperatures will increase. Precipitation is another issue. The mean values of rain amounts may not change much, but the models are predicting we will have more years of large rainfall than we've seen in the last 30 years."

Bertetti expounded that those cycles could be extremely important for the Edwards Aquifer because they could be drought mitigating events. And one of the things the region has learned from past prolonged droughts is that it takes a major rain event, a flood in the 99th percentile of rain occurrences, to replenish the aquifer. So, more frequent rain events of these types could ease the region's susceptibility to drought impacts in coming years. That would be good news and something not expected because most seem to think that higher temperatures will produce more droughts.

"Obviously, we don't know for certain right now how this all will play out because we are just now running the models to help us understand the system response. I guess you could say that it's an edge of your seat kind of anticipation we're going through until we get the results from the model runs in a month or so."

In case you're wondering, the downscaling of computer models to look only at the Edwards Region's climate future required supercomputers in Oklahoma and at UTSA running a few days to process all of that data. Another model that takes the climate data and turns it into recharge information takes about a day to run. All of that information is then moved to the current Edwards Aquifer hydrologic model where several scenarios are being reviewed. Each scenario takes an average of 14 hours to produce results. Bertetti said his team needs to run numerous scenarios in order to have a well-rounded look at the future. Despite those long slogs of time, he says they are confident the team will meet its deadline in the federal permit application timeline.

And how does Bertetti think the overall process is going?

"We started this climate modeling process about five years ago. And where we are right now, as a regional agency, I think we can safely say that we are one of the leaders in the State regarding how we're using climate analysis to form projections about future conditions in the Edwards Aquifer ecosystem. And while the U.S. Fish and Wildlife Service only says we have to address the issue in some manner, we feel like once we have completed our work, we will have very well-reasoned science for the permit partners to base decisions and direction for the application when it comes to climate change.

"This work is complicated and somewhat uncertain at the same time. But we've found that by gathering the best data available, working with leaders in the climate analysis field, and then strategically putting those pieces together, we will be able to have as good of a look into the future as is possible now."



EAHCP STEWARD SHORT TAKES

[Listen to this month's EAHCP Steward Podcast by clicking here.](#)

EAHCP Happenings

- The **2023 EAHCP Annual Report** is now available to view. https://www.edwardsaquifer.org/doc_category/annual-reports/
- The **Landa Park Aquatic Center Parking Lot Bioretention Project won an award** from the Texas Recreation & Parks Society for Park Development Innovations. Read about that project in a past Steward Newsletter here:

https://www.eahcpsteward.org/files/ugd/3c31eb_2abd504c5e604c19829123df8452ea43.pdf
- **Save the Date!** – The National Habitat Conservation Plan Coalition will be having their annual meeting December 10 -12, 2024 in Palm Springs, California. Visit <https://www.nhcpcoalition.org/2024-annual-meeting/> to join the mailing list and stay tuned for more information.
- **2024 EAHCP Calendar:**<https://www.edwardsaquifer.org/habitat-conservation-plan/eahcp-calendar/>

How to Access EAHCP Committee Documents

The EAHCP Committee documents are available at this link: www.dropbox.com/scl/fi/r1ku53l7gz446edghx91l/How-To-Access-EAHCP-Committee-Meeting-Documents-on-EAA-Legistar_v3.mp4?rlkey=gr0qg4hodp47w47ekcnsepx1r&dl=0

