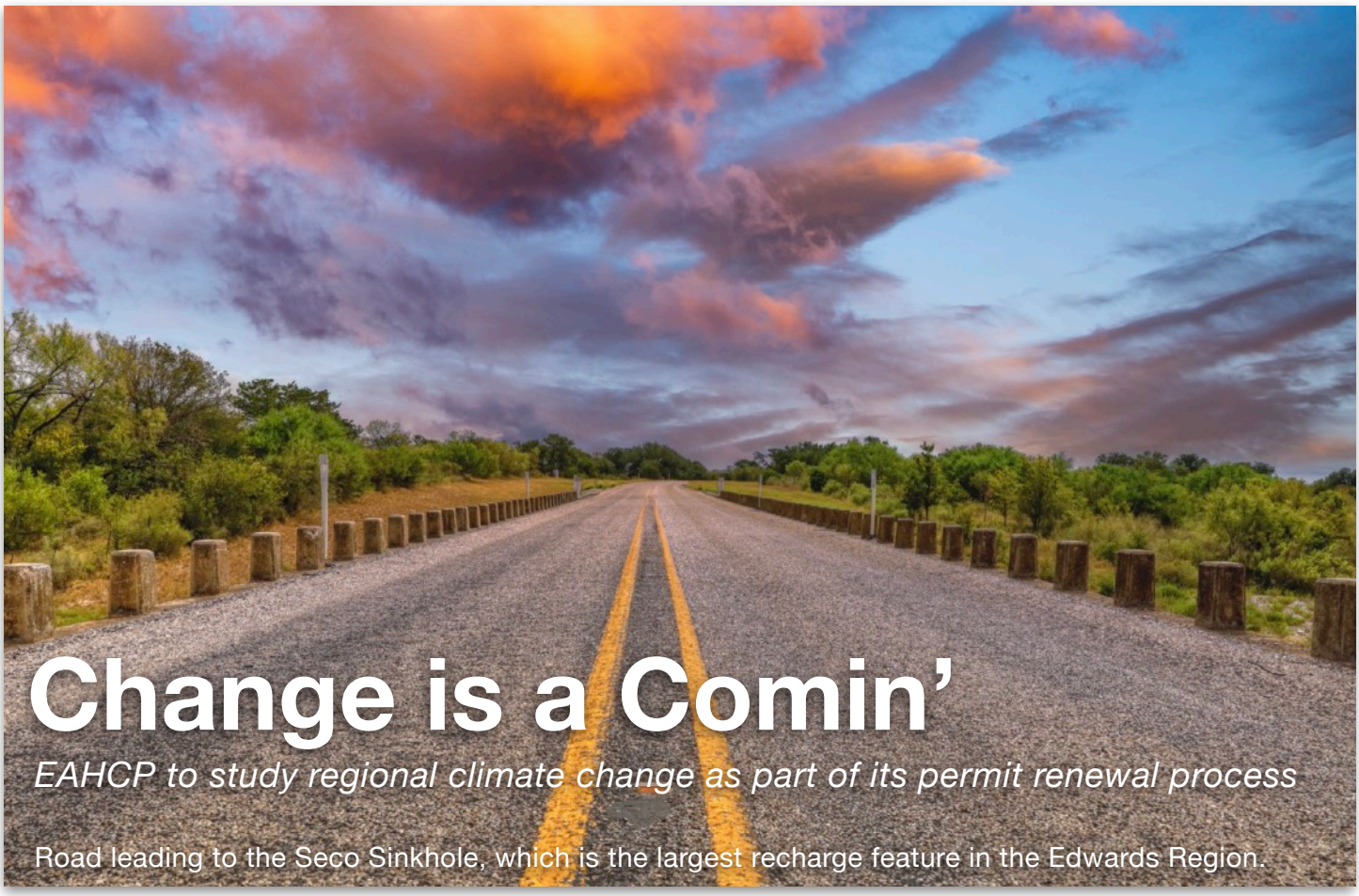


Change is a Comin’

EAHCP to study regional climate change as part of its permit renewal process

Road leading to the Seco Sinkhole, which is the largest recharge feature in the Edwards Region.

Climate change.

Those two words have sparked many passionate debates among the general public and scientists alike over the past several years. But, when you speak with those responsible for addressing the issue in a federal permit setting like the Edwards Aquifer Habitat Conservation Plan (EAHCP), the discussion becomes a little more palatable, a lot more complex and truly fascinating.

Change is a Comin' - Continued

"Those who know some background on the EAHCP understand that the bottom line goal is to protect the endangered species in the Edwards [Aquifer] Region by implementing measures to maintain springflows at the Comal Springs and San Marcos Springs, even during a drought of record," said Paul Bertetti, who leads the hydrological modeling team at the Edwards Aquifer Authority (EAA). "As we're coming up on the EAHCP federal permit renewal, the U.S. Fish and Wildlife Service will be examining how we address climate change in our application. At this point, the agency's guidelines are fairly general, so it will be up to us to define a scientific approach that we think is the best way to move forward."

Paul Bertetti leads the EAA computer modeling team.

Bertetti explained that the challenge in defining a method of addressing climate change is that the effects of climate change and scientists' understanding of those changes evolve over time. Given that fact, it is a wise thing that rigid federal standards are not set in stone and that each HCP applicant can consider their own circumstances and address those accordingly using the best science available at the time.

"Another key point of understanding is that the Edwards Aquifer Authority does not employ climate scientists and our job is not to model the climate," Bertetti explained. "What we are doing is relying on the hard work and research of other climate scientists worldwide to help us make some assumptions about what could happen in our region over time. What the current data is telling us is it is generally expected to be a little warmer in this area of the country over the next few decades. However, the prospects for precipitation are uncertain. Some indications are that there could be more rain but that it could come in large storm events. That could play a part in how the Edwards Aquifer takes in that precipitation as recharge. For example, if the ground is drier more often and we are receiving larger rain events, then will the aquifer be less efficient in its water intake? We are not completely certain about those impacts, and that affects how we address the overall climate change issue."

Another difficult data point to measure is the fact that the Edwards Aquifer Region's own climate boundaries vary from semi-arid in the west to a wetter climate in the east. Consequently, EAA computer modelers will have to find a way to apply relatively uncertain broader climate predictions across a diverse regional climate situation. That task will be complex in many ways.

Change is a Comin' - Continued

One of the initial steps EAA hydrological modelers will take is to convert projected climate data points such as temperature, precipitation, amounts of sunlight, rates of evapotranspiration and others into data inputs that relate to Edwards Aquifer recharge. Currently, recharge is calculated by the U.S. Geological Survey which uses many stream flow gauges across the recharge zone to determine recharge data. The next step would be to do some mathematical correlations between the new and traditional data. Bertetti also cited that the EAA has continued to improve its weather data collection in recent years, but his hydrological modeling team must also account for some data that goes back several decades.

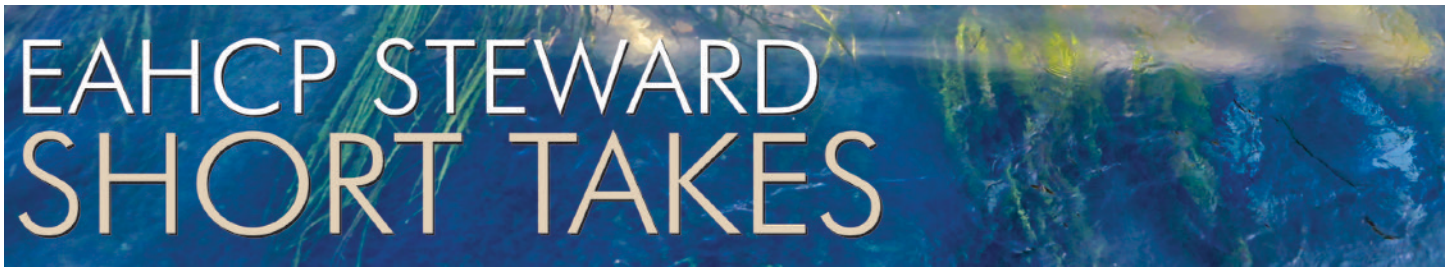

Weather station at the EAA Research Center

"There are many parameters out there that can go into our work, but at some point you have to do your best to produce sound information that decision makers can use in this relatively small geographic area," Bertetti noted. "We are plugged into climate science gathering groups both on a national and regional level. Our focus over the next 18 months will be to take their most recent data and apply it to the Edwards [Aquifer] Region. We might have to develop scenarios that apply differently in the western and eastern parts of the region as well as how those scenarios play out over time."

While that effort might seem like an impossible task to most, Bertetti said they would be leveraging some current artificial intelligence (AI) applications to help them sort through the mountains of data. This type of sophisticated technique creates some efficiencies in the number of calculations needed to compare a set of inputs to what the team is looking at in the final outputs. One example could be that modelers would input current information on precipitation, temperature and water levels in the aquifer to produce a representation of how aquifer levels would be affected by changes in temperature and rainfall over time. The results from those model runs would provide insights the EAHCP team could use in recommending adjustments to existing springflow protection measures or new measures altogether.

"One of the problems with some AI applications is that they are somewhat like a black box because you can't really see the calculations being made," Bertetti acknowledged. "So, it is our intent to use what's called 'explainable AI' that allows us to better understand the complex calculations being made which in turn helps us be more transparent to all stakeholders. But the big advantage here is that we can process large amounts of data, sometimes seemingly unrelated data, and produce sound results that can enhance our overall understanding of this complex hydrological system.

"Suffice to say, this work is complicated and somewhat uncertain at the same time. However, we are confident that we can provide valuable insights to the EAHCP team and the consultant they will be using for the federal permit renewal. We have an excellent, experienced team of hydrological modelers on staff, but in the end, we understand that we can't predict how the climate will change over the next several decades. But, we can provide a scientifically sound set of scenarios the applicants can feel good about in choosing the best way forward in renewing the federal permit."



A Decade of Delivering - Top 10 List

Last month, the *EAHCP Steward* took a short trip down memory lane as we kicked off a celebration of 10 Years of Habitat Conservation. Part of the *EAHCP Steward* feature article was our Top 10 list of program highlights over the past decade. However, we only listed nine of the Top 10 highlights in the story and asked our readers to vote for the milestone they thought should round out our top 10 list. The winner turned out to be the program achieving a 129 percent increase in Texas wild-rice coverage in the San Marcos River. Here is the final Top 10 list.

#1: 2013 USFWS Approves ITP

#2: 2013 - 2016 Bank Stabilization Projects

#3: 2014 EAHCP Steward

#4: 2016 Texas Environmental Excellence Award

#5: 2013-2018 Submerged Aquatic Vegetation Study

#6: 2018 National Academy of Sciences

#7: 2019 Signing of EAHCP Phase 2 Resolution

#8: 2019 EAHCP Refugia Grand Opening

#9: 2020 ASR Water Storage Goal Attained

#10: Texas wild-rice coverage in the San Marcos River increases by 129%

Upcoming EAHCP Meetings and Events

- **EAHCP Joint Committee Meeting** on March 24, 2022
- Save the date: **National Habitat Conservation Plan Coalition Conference** will be held on October 25-27, 2022 in Austin, Texas. More details to come. Click here to read the conference flyer.
- **Spring Lake Earth Day Festival** – April 23 - 10 a.m. to 3 p.m. Learn more at the festival web link: www.meadowscenter.txstate.edu/Education/earthday-festival.html

Sessom Creek Work Day Set for Saturday, March 26

The next volunteer workday at Sessom N.A. is scheduled on Saturday, March 26 from 9-11 a.m. Tasks will include spreading and raking seed, pulling invasive seedlings, building log terraces and litter removal. Tools will be provided, but bring a water bottle. The group will meet at the Vie Lofts parking lot. Parking will also be available along Chestnut, Walnut and Acorn Streets. This will be the last workday at Sessom Natural Area until the fall. The group will be transitioning monthly workdays to Prospect/Purgatory Creek Natural Area starting in April. You can RSVP **here**.